2010-2012 WE&T PROCESS EVALUATION

VOLUME II: CONNECTIONS

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Final

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1. EXECUTIVE SUMMARY

The WE&T Connections sub-program consists of seven program elements covered in this study (five that target K-12, one that targets community colleges, and one that targets higher education). These elements seek to "promote green careers; educate students on energy, water, renewable energy, demand response, distributed generation green house gases and the environmental impact, with the goal of influencing day-to-day decisions of students and their households; and educate on the benefits of adopting energy efficiency and demand response policies at their facilities to help them save energy and money"[1]. These elements target a variety of ages ranging from kindergarten through high school and into college-level initiatives. They also vary widely in the grades, educators, and geographies that they target.

Our evaluation set out to answer the following questions:

- Strategic Alignment: How is the WE&T program aligned with California's Strategic Plan and the WE&T Needs Assessment? And what should the utilities do now to ensure that they can meet the Strategic Plan's goals of this effort over the next 10 years?

- Program Effectiveness: Is the WE&T Connections Program effective in terms of following learning principles and/or best-practice educational methods; meeting the needs of the target market, and covering the energy efficiency related topics desired?

PROGRAM EFFECTIVENESS

Among the four established K-12 program efforts, we found the following:

- Energenius is the most cost-effective and has a broad reach within PG&E's territory. It offers teachers who are motivated and proactive about bringing energy efficiency education into the classroom a selection of online lesson plans, and they can choose how and how much to integrate this into their current curriculum. The current curriculum is very well designed to support implementation and complies with the California Content Standards.

- LivingWise is a little more costly, and also has a broad reach within SCE territory, where this program is offered. This program couples the educational element with distribution of energy saving kits, which contributes to energy savings and education. The cost is largely driven by cost of energy saving kits. The LivingWise curriculum is generally well designed but could be improved strengthening the positioning of in-class lessons and activities (most of which are currently positioned as optional) and providing for in-school follow-up of at-home activities. This curriculum does comply with the California Content Standards.

- PEAK Student Energy Actions (PEAK) is more costly than LivingWise, and while it is offered in both PG&E and SCE territory,[2] its reach is more focused, reaching large numbers but in areas where program staff are able to deliver teacher training, The curriculum is flexible and can be

[1] Southern California Edison, *SCE's 2009-2011 Energy Efficiency program Plan Implementation Plans*, March 2009.

[2] The PEAK program is also offered in SDG&E territory, but the implementation there is outside the scope of this evaluation.

implemented over the course of a few days, a semester, or the entire school year in 3rd to 7th grades (often a science curriculum). The current curriculum is very well designed to support implementation and complies with the California Content Standards.

- Green Schools is very different from the other three K-12 offerings given that it is more project-based with classroom curriculum support that varies by school. It also offers educational materials that are not used consistently in its current form. It has a much more targeted focus (working with small groups of students within a school on a school-based project). Given the variation in program design, it is not possible to estimate the cost per participant at this time however SCE is reviewing this program's theory and is working with the program implementer to determine the appropriate effectiveness metrics for this program. Such educational programs need to be measured in ways to assess their effectiveness and duly credit them for energy consumer behavior transformational approaches.

  Given the varying nature of how schools implement this program, it is difficult to determine how many students and their households were impacted by this program and to understand what level of education each student received. One barrier to implementation was school administration buy-in to the program – few teachers said that this was an issue, but those who did raise the issue said that low buy-in from administrators limited their ability to implement the Green Schools program beyond a small group of students. Further, the curriculum suggested by the program for classroom instruction would need to be adjusted to fully support alignment with the goals and with the California Content Standards.

All programs appear to generally meet the needs of the market and provide the information desired. Overall, we found that all of the programs are bringing new energy saving concepts into schools and classrooms:

- 57% of the schools or districts touched by the program self-report that they had not provided education on energy efficiency or energy conservation outside of the program.

- 43% of teachers had not taught students about energy efficiency or conservation outside of the program.

The large majority of educators touched by the programs (74% to 79% depending on the program) also strongly agreed that students are learning about ways to save energy through the offerings.

While there are four very different program designs, we found that different designs support different teacher preferences for delivery. Based on teacher responses, there is a clear split in the type of programs that teachers desire (i.e., supplemental and more flexible versus integrated and more structured). Some teachers prefer individual lessons that can easily be integrated into their curriculum (such as PEAK) while others prefer supplemental units (similar to Energenius design). As such, there is more than one good design, and offering both will allow the programs to reach a broader number of schools and teachers.

While the four programs serve K-12, they focus on grades 3-8. High school students are mostly underserved by the current programs, so the WE&T program is developing new and updating existing programs to address this need.

- Green Schools is already working with some high schools. Because of the flexible nature of the program, the schools can incorporate the green career element in a number of ways. Some schools have had green career professionals speak at school assemblies. Green Schools also has developed green career brochures and on-line career resources. This may increase the students' awareness of green careers. SCE also is considering the possibility of

targeting only the high school level with Green Schools given that it has the potential to give high school students hard skills and training with its Student Energy Auditor Training (SEAT) component and that this component aligns well with California's strategic plan for workforce education and training. Given that Green Schools largely is a project-based education program, it has the potential to provide a higher level of education in the form of training on hard skill development at the high school level for a relatively small group of students, while leaving the broader-base basic energy education task to the other K-12 classroom-based curriculum programs.

- Energenius is developing the Energenius Green Career Resource Guide as a resource for high school educators and counselors to provide information to their students. This is a good awareness-building resource but does not provide any real exposure to green careers or the education or career options available to the student to start a green career.

- PEAK will be rolling out a high-school curriculum which will include career preparation elements.

STRATEGIC ALIGNMENT

The Connections Program is also tasked with contributing to the WE&T vision by striving to achieve the two goals set for this sector:

1. Establish energy efficiency education and training at all levels of California's educational systems; and

2. Ensure that minority, low-income, and disadvantaged communities fully participate in training and education programs at all levels of the Demand-side Management (DSM) and energy efficiency industry.[3]

These programs are in the process of aligning with the strategic plan. All of the K-12 programs have made changes to meet the strategic alignment objectives. In particular, all have added career exploration into their curriculum in some fashion, and three of the four K-12 efforts have added some effort that targets low-income or minority communities. In addition, two newer efforts (Developing Energy Efficiency Professionals [DEEP] and Green Pathways) were specifically developed to target low-income and minority communities, as well as career advancement.

Most programs have added low-income and minority participation targets, but how this is defined varies by program. Some programs such as Green Campus have not necessarily made changes to target disadvantaged groups because they are still struggling with how to incorporate this into a program that attempts to reach the entire student body at Cal State and UC schools. This directive may not be applicable or appropriate for the Green Campus program.

The WE&T Connections program contributes to the Strategic Plan's WE&T goal of "establishing energy efficiency education and training at all levels of California's educational systems." Prior to the Strategic Plan, the IOUs had programs that addressed most education levels; however, there was a clear gap in addressing the high school level more directly with a workforce preparation program and in addressing the community college level with a program that catered to the varying needs across

[3] California Public Utilities Commission. (2008). *California Long Term Energy Efficiency Strategic Plan.* San Francisco.

community colleges. Therefore, two new programs were created in this program cycle to fill these gaps.

- **The DEEP program** is a new program that started in the 2011-2012 school year targeting community college students. It is working with three schools in California to test three different approaches to working with community colleges.

- **Green Pathways** is a program designed specifically for high schools. It was still in the proof-of-concept stage during this evaluation. This is an online-based course that creates a community to connect high school students with subject matter experts who can help them make green education and career decisions. It is designed to educate students on careers and energy efficiency concepts.

It is believed that the most cost-effective and sustainable method of reaching all levels in the education system is to embed energy efficiency concepts into the standard curriculum across the state and at all levels of the education system. Changing and updating curriculum throughout the state education system is a lofty task, one that requires a large amount of collaboration, support, and decision-making from multiple educational institutions and the California Department of Education. This kind of effort will likely have to be championed by a collaboration between the IOUs, curriculum designers, and the CPUC.

Based on these study findings, we recommend the following:

- Connections-wide, the program should set clearer guidelines for what it expects the Connections programs to accomplish. These different programs provide different types, and more importantly different levels, of engagement with energy efficiency topics. Some require only a few hours of classroom time, while others require months or even years of engagement to be fully effective. In terms of content, the goal is to educate students on Integrated Demand Side Management (IDSM) and career options. The programs need to ensure messages are not diluted by trying to do too many things. The program should consider the relative importance of educating students on IDSM and career options so that programs are able to place the appropriate amount of emphasis on each. Depending on which goals are most important, we would recommend different strategies (See Recommendations Section for more details). This report outlines several areas of improvement for the programs to better align with the Strategic Plan and improve its implementation effectiveness. Since Green Schools has a different program design than the other programs targeted toward K-12 students, we suggest the following specifically for the Green Schools program:

    - Consider placing a great emphasis on the student project teams and how the program might be able to increase the number of project teams at a given school.

    - Clearly demonstrate how suggested curriculum meets specific California Content Standards and only suggest curriculum that does meet standards.

    - Move toward a more prescriptive approach to curriculum so that teachers do not have to create their own lessons. The curriculum should adhere to Content Standards, be targeted to specific grade levels, and cover IDSM and green career concepts.

    - Break up training sessions into specific grade levels (K-5, middle, high school) and tailor the training to those grade levels.

- Consider a program design that builds from one grade level to the next starting in the primary years through high school (Energenius' model is the most closely aligned with this) with clear

goals of what students should learn at each level. Reaching large numbers of schools and allowing for the infusion of energy efficiency and energy conservation into a multiple year curriculum (rather than just a one-time unit) will ultimately help to meet the state's goals of transforming the market. However, to have a broader reach, multiple designs and flexibility will be needed. To appeal to various teacher audiences, the program should continue to offer both the more intensive offerings (e.g., PEAK) and the supplemental offerings (e.g., Energenius).

- Look at ways to provide more robust support for teachers, possibly through online videos similar to You-Tube style videos

- Link and leverage programs to share resources:
  - Green Schools could encourage high school students to participate in Green Pathways' online course
  - Green Schools could expose students to Energenius' Green Resource Guide or encourage LivingWise participation among Middle Schools
  - Green Campus interns could visit Green Schools at the high school level
  - Green Pathways could encourage the Centers to participate as "green gurus" and potentially set up non-paid internships

- Consider development and implementation of appropriate summative evaluation instruments to provide meaningful information about whether the program(s) is achieving goals in terms of students' performance

Green Campus-Specific

- Green Campus has the potential to be a linchpin program in building the "Connection" between K-12 education and career training in energy efficiency (along with DEEP and Green Pathways, which are still in the development phase). The program has been very effective in developing a core group of students with a strong interest in sustainability careers through its program internships. Going forward into 2013 and beyond, the program should continue this focus while also considering ways to expand opportunities for green career development on its wider participating campuses.
  - Of the four pillars, green career development should be prioritized over energy savings projects. Outreach is valuable for promoting EE awareness and behavior change, but savings as a KPI is not inherently important for this program. WE&T is more important than resource acquisition – developing savings projects are a valuable means of advanced training for Green Campus interns, but should not be the driving metric of the success of campus projects.

- Consider individual campus needs in setting KPIs. Set relative KPIs (e.g., outreach to 10% of student population/year, 10% energy savings). Setting absolute goals statewide puts smaller schools and newer programs at a sometimes severe disadvantage compared to larger schools with long-standing programs. The current KPIs treat all participating schools as though they have the same barriers, populations, and potential for savings – however, our evaluation has shown emphatically that this is not the case. These absolute numbers also force students to focus on KPIs that are not as important to making the program effective under WE&T.

- Program staff should continue to focus on the high-level strategy for promoting academic infusion. Green Campus interns should focus on academic support.

- Consider moving some training elements of the student summit to the beginning of the school year rather than after winter break. Students consider the summit very valuable for training and networking, and the summit allows students to brainstorm in collaboration with their peers at other campuses. It also provides a very valuable orientation and training opportunity for the newest interns. Due to campus stakeholder availability, this may require splitting the two meetings (the student meeting and the stakeholder meeting) into separate events.

- Increase networking opportunities across campuses, especially for campuses that are struggling to meet their goals. Campuses with similar issues and barriers (such as campuses with high levels of commuters, small campuses, and LEED campuses) should get special opportunities to network and discuss effective strategies.

- Consider supporting or implementing for-credit internships on all participating campuses. This is way to expand reach and bring more students into the in-depth career training of Green Campus without providing additional paid internships.

Future Evaluation Efforts

- We note that evaluating Green Campus and Green Schools with traditional methods is challenging due to the varying implementation activities at each school. In future evaluations of these programs, we highly recommend that evaluation efforts include case studies of at least three participating schools. Given the research objectives and budgetary constraints of this study, we were unable to execute this approach. However, we know that schools differ greatly in their strategies and needs for program implementation. A case study approach would allow future evaluators a more comprehensive portrait of these programs, allowing them to better delve into the unique impacts of the program on each school.

2. PURPOSE OF STUDY AND STRUCTURE OF REPORT

Over the 2010-2012 program cycle, the California Investor-Owned Utilities (PG&E, SCE, SCG, and SDG&E) are implementing the Workforce Education & Training (WE&T) Connections Program.[4] The focus of this process evaluation was to assess the alignment of the program with California's Energy Efficiency Strategic Plan and the implementation effectiveness of the Program.[5]

The state of California has determined that there is a need to educate California's youth to meet the state's long-term energy savings goals. Two key documents guide the alignment of the utilities' WE&T program with the state's need:

- **California's Energy Efficiency Strategic Plan** (Strategic Plan): Established that there was a need for workforce education and training to meet the long-term goals of the plan
- **California's Workforce Education and Training Needs Assessment Report** (Needs Assessment): Provided an inventory of workforce education and training programs across the state, identified collaborative opportunities, and laid out recommendations for the utility workforce education and training efforts

Our evaluation therefore set out to answer the following questions:

- **Strategic Alignment**: How is the WE&T program aligned with California's Strategic Plan and the WE&T Needs Assessment? And what should the utilities do now to ensure that they can meet the Strategic Plan's goals of this effort over the next 10 years?
- **Program Effectiveness**: Is the WE&T Connections Program effective in terms of following learning principles and/or best-practice educational methods, meeting the needs of the target market, and covering the energy efficiency related topics desired?

The Evaluation Team was tasked with providing recommendations and support to complement the foundational efforts that have been laid by the utilities. The team enhanced the utilities' response to the Strategic Plan by documenting how the sub-programs align with the Strategic Plan, where the gaps lie, and what changes should be made to the WE&T program to help reach the long-term goals.

The major findings of this report focus on the higher-level, cross-program findings and recommendations. These sections are followed by an Appendix, which provides detailed findings for each of the WE&T sub-programs.

[4] This study was funded by PG&E and SoCalEdison. The Sempra utilities (SoCalGas and SDG&E) WE&T Connections related activities are not included in this study.

[5] California Public Utilities Commission. (2008). *California Long Term Energy Efficiency Strategic Plan.* San Francisco.

3. STUDY METHODS

This evaluation covers seven key programs under the WE&T Connections umbrella. Due to budgetary constraints and implementation timing, some programs received a deeper level of evaluation than others. Much of the evaluation resources were allocated to established programs (Green Schools, Green Campus, PEAK Student Energy Actions [PEAK], LivingWise and Energenius). Two programs were in the beginning or pilot phase of implementation (Green Pathways and Developing Energy Efficiency Professionals) and therefore received a limited evaluation. The findings and recommendations from this study were presented to the Investor-Owned Utilities (IOUs) in May and June of 2012 so that they could be considered for the 2014-2016 program cycle.

3.1 PROGRAM MATERIAL REVIEW

The program materials review was the very first task of our evaluation, so that the Evaluation Team could become familiar with both market needs and how the programs were intended to fill those needs. The key materials reviewed were the California Workforce, Education, and Training Needs Assessment (the Needs Assessment) and the California Long-Term Energy Efficiency Strategic Plan (the Strategic Plan).

The Strategic Plan is the California statewide plan for reaching its energy savings goals from 2009 to 2020 across all of its programs and policies. The Needs Assessment provided guidelines for reaching the Strategic Plan's goals specifically regarding workforce development. The Strategic Plan provides overarching *objectives* for the WE&T program, while the Needs Assessment provides *guidelines* for the WE&T programs to use to reach these objectives. These two documents, therefore, provided us with key information for formulating our evaluation metrics.

Our program materials review also included a review of specific program materials such as Program Implementation Plans (PIPs), program websites, past process evaluations, and program quarterly and annual reports. Reviewing these reports allowed the team to better understand the individual program components and how they fit into the marketplace, as well as determine criteria for measuring program effectiveness.

3.2 PROGRAM STAFF INTERVIEWS

The Evaluation Team conducted a total of 11 in-depth interviews with program implementation staff, as well as IOU and CPUC program management staff, in July and August 2011. Our interviews included the following:

- Two interviews with IOU staff at the two participating utilities (PG&E and SCE)
- One interview with CPUC Energy Division (ED) staff
- One interview with program implementation staff for each of the seven Connections sub-programs

Interviews with IOU and ED staff focused on building our understanding of the expectations of each of the seven sub-programs of Connections beyond what is already known from the Strategic Plan, the Needs Assessment, and the PIPs. Interviews with program implementation staff focused on details of

the specific program designs and education practices, as well as their overall awareness and implementation of the Strategic Plan and Needs Assessment.

3.3 PROGRAM OBSERVATIONS

Our Phase II evaluation included three observations: one observation of a Green Schools teacher training session, one observation of a PEAK teacher training session, and one observation of the Green Campus annual intern summit. We conducted the two training observations in September and October 2011, while we conducted the Green Campus annual intern summit observation in January 2012. The purpose of these observations was to supplement our existing knowledge of each program's implementation and better understand how the programs support participants.

3.4 PARTICIPANT SURVEYS AND INTERVIEWS

The Evaluation Team conducted participant surveys and in-depth interviews in February and March 2012. Our surveys targeted participating teachers in the four K-12 curriculum programs, and the participating student interns for Green Campus.[6] Table 1 summarizes the population, sample sizes, and response rates by program.

Table 1. Summary of Participants Surveyed and Response Rates

Program Name	Participant Type	Participant Population Size (2010-2011 School Year)	Participant Population w/ Valid Contact Information [a]	Survey n	Response Rate [b]
K-12 Programs					
PEAK Student Energy Actions	Teachers	466	373	78	21%
Energenius [c]	Teachers	858	617	69	11%
LivingWise	Teachers	1089	272	71	26%
Green Schools	Teachers, School Staff	191	48	13	27%
Total		**2604**	**1327**	**231**	**17%**
Higher Education Programs					
Green Campus	Interns	88	39	18	46%

[a] Removes respondents with invalid contact information (defined as email addresses for PEAK, Energenius, and LivingWise, and phone numbers for Green Schools). Also removes customers who do not qualify for the study (e.g., did not teach the program during the evaluation period).

[b] AAPOR response rate 4.

[c] Note regarding Energenius: As of the 2011-2012 school year, several of the Energenius curricular materials have been updated. Some materials have been removed, including the Bill Buster and the Habits programs. We also note that a large proportion of survey respondents teach kindergarten (28%) and/or first grade (12%) and use the Big Book, which has been updated since the 2010-2011 year.

[6] Green Pathways and DEEP were still in the pilot phase at the time of our evaluation and were not included in our participant interviews.

K-12 Surveys

The four K-12 surveys were designed to be identical for all key questions so that results could be compared across programs. These cross-cutting questions included the following topics: target audience, overall program satisfaction, energy education outside the Connections programs, training and staff support, implementation of materials in the classroom, student reactions in the classroom, students' take-home energy knowledge, career development provided and needed, and ability to continue teaching the topics without program support (program sustainability). We also asked teachers about their overall needs and preferences for teaching energy efficiency topics, regardless of which program they are currently using.

Each program survey also had some questions pertaining to their individual program implementation. The LivingWise survey, for example, had a section that pertained strictly to the energy-saving kits distributed.

Our surveys for three K-12 programs — Energenius, PEAK Student Energy Actions (PEAK), and LivingWise — had virtually identical survey methodologies. For all three programs, we sent participating teachers an online survey using email addresses provided in the customer database.[7] The surveys given to these respondents were also identical for all key questions.

We conducted the PEAK teacher survey from January 31 to February 1, 2012, with 78 total respondents and ±8.5% standard error at 90/10 precision. We conducted the Energenius survey from February 10 to February 17, 2012, with 69 total respondents and ±9.5% standard error at 90/10 precision. We conducted the LivingWise survey from February 27 to March 1, 2012, with 71 total respondents and ±9.4% standard error at 90/10 precision.

We conducted the Green Schools survey using the same basic survey instrument, but using in-depth interviews rather than the online survey. Green Schools has a slightly different program design that allows for much more variation by participants compared with the other K-12 programs. The in-depth interview format allowed respondents more flexibility to describe their individual experiences implementing the program while still allowing us to ask key cross-cutting questions. Furthermore, it is notable that Green Schools interviewees included not only teachers but also school staff such as curriculum administrators and facilities staff. Our interviews included eight teachers, two principals, one assistant principal, one administrator, and one custodian.

We conducted the Green Schools interviews from March 4 to March 20, 2012, with 13 participating teachers and school staff members. Although a much smaller number than the other programs, this is a comparable proportion of the population, as only 65 schools participated in the program during the 2010-2011 year. However, because of this small number, we did not calculate precision or standard error.

Teachers and staff who completed the survey received an incentive check for $50 (via mail). These incentives were offered on a first-come, first-served basis for the first 65 respondents to the Energenius, PEAK, and LivingWise surveys, and to all respondents for the Green Schools interviews.

[7] In the case of LivingWise, email addresses were not provided in the customer database, so we contacted the schools and visited the school websites to obtain as many valid email addresses as we could find.

Higher Education (Green Campus) Interviews

The Evaluation Team conducted in-depth interviews with 18 participating Green Campus interns from February 20 to March 6, 2012. The key areas discussed in the Green Campus interviews included overall program satisfaction, training and staff support, program activities and implementation, challenges and successes meeting program goals, unique program value on campus, and additional resources wanted or needed. To ensure that we obtained useful program feedback, we interviewed interns who had participated in the Green Campus program for at least one full school year. Because of the small sample size, we did not calculate precision or standard error for this group.

3.5 INSTRUCTIONAL DESIGN ASSESSMENT

The Evaluation Team performed an instructional design assessment for the four programs that have curricula (Green Schools, LivingWise, PEAK, and Energenius). This assessment helped us address several of the research questions that are the focus of this process evaluation:

- Do the sub-programs meet the needs of their target audience?
  - Do the educational materials and teacher support materials align with the needs of the schools?
  - How well do the educational materials and teacher support materials align with relevant content standards for California Public Schools (e.g., Math, Science, and English Language Development)?
  - Are the learning objectives appropriate to students' grade level and other relevant characteristics?
  - Do teacher materials effectively support implementation and delivery (e.g., guidance to teachers regarding presentation of information, use of learning activities, providing feedback to students, and following up on key learnings)?
  - How well do the program educational materials and support materials help develop energy efficiency concepts and "green career" options and paths?
- Are the sub-programs using effective learning strategies for the target audience?
  - Do the materials reflect strategies and tactics consistent with effective learning principles and best practices?
  - Do the materials conform to the California Department of Education's Education and the Environment Initiative (EEI) criteria?
  - Are the learning objectives and associated lessons at an appropriate performance level, targeting appropriate learner outcomes?
  - Are there specific, measurable success criteria associated with the sub-program's lessons and activities?

To this end, we established four "yardsticks," or sets of evaluation criteria, that we used to assess the courses in key areas:

A. Learning Effectiveness

B. School/Teacher Support

C. Learning Focus

D. Materials and Equipment (lesson-specific details used to score some higher-level criteria in yardstick B)

Each yardstick reflects specific, measurable criteria based on educational theory and California Department of Education EEI criteria[8] and were refined based on feedback from IOUs and ED.

All assessments were conducted by two senior instructional design professionals who independently rated the courses on the criteria specified in the yardsticks. (See *Appendix B: Yardstick Criteria and Scoring Method* for details on the specific criteria and scoring methods for the yardsticks.)

Before beginning the material reviews and audits, the raters were oriented to the yardstick criteria and participated in a normalization process. (That is, they rated "sample" material and all raters' results were compared. When different raters had different results for a given criterion, the reasons behind the differences were explored and resolved, serving as a basis for agreeing on how to consistently rate that criterion in the future.)

After conducting the evaluations, we synthesized the results into a single rating for each criterion and an overall rating for each dimension (set of related criteria in a yardstick).

When there were differences in scoring between raters, the lead instructional design consultant resolved the inconsistency with input from the raters.

During the instructional design assessment, we reviewed all the materials made available to us. In addition, we conducted a high-level review of the relevant supporting information available at the programs' web sites. (See *Appendix C: Educational Materials Reviewed* for a listing of the specific materials reviewed for each program.)

Table 2. Number of K-12 Lessons Reviewed

Program	# of Lessons Reviewed
Energenius	32
PEAK	22
LivingWise	5
Green Schools	22

[8] "EEI criteria" refers to criteria adopted by the California Department of Education to evaluate instructional materials developed to support the Education and the Environment Initiative (EEI). The goal of EEI is to develop a curriculum that helps students achieve mastery of California's Academic Content Standards in the context of California's approved Environmental Principles and Concepts. The EEI evaluation criteria are based on the State Board of Education's Instructional Materials Criteria. For more information, see: http://www.cde.ca.gov/ci/sc/ee/eeievalcriteria.asp

4. SUMMARY OF KEY FINDINGS

This section summarizes our findings across all of the WE&T Connections sub-programs. We provide detailed data for each specific program in the Appendices.

4.1 INTRODUCTION TO THE PROGRAMS

The WE&T Connections program is operating as a statewide program for the first time in the 2010-2012 program cycle. The program consists of multiple program components targeting three different tiers of the education system. Table 3 shows the seven WE&T Connections efforts that are included in this process evaluation.

Table 3. WE&T Connections Program Components

WE&T Connections – Program Components	Education Tier
Energenius (PG&E, grades K-8)	K-12
PEAK Student Energy Actions (statewide, grades 3-7)	K-12
Green Schools (SCE, grades K-12)	K-12
LivingWise (SCE, grades 5-6)	K-12
Green Pathways (high school and college sector)	K-12 and potentially Community College/College/University
Developing Energy Efficiency Professionals	Community College
Green Campus	College/University

The WE&T Connections program consists of both statewide and local IOU efforts. This Connections evaluation focuses on the efforts of two utilities: SCE and PG&E. Across these two utilities, the Connections sub-program is a $13 million effort.

Table 4. WE&T Connections Budget by IOU

Utility	WE&T Connections	2010-2012 Budget
Pacific Gas and Electric (PG&E)	1. PG&E Energenius 2. Green Campus 3. Community College 4. Green Pathways	$4,110,424
Southern California Edison (SCE)	5. PEAK 6. SCE Green Schools 7. SCE LivingWise	$9,003,792
Total		**$13,114,216**

Below we provide short descriptions of the individual program components included in the WE&T Connections Program.

4.1.1 K-12 Programs

Within the Connections program, PG&E and SCE currently offer four programs that are geared toward K-12 students: Energenius, PEAK, LivingWise, and Green Schools. We recognize that SoCalGas and SDG&E also run some of these programs in their jurisdictions; however, this study focuses on PG&E's and SCE's efforts.

Energenius

The Energenius Program provides educational materials on energy, energy efficiency, and conservation to K-8 teachers within the PG&E service territory. The program materials include curriculum guides with detailed lesson plans, student activity books, and posters. Teachers either order online, at conferences, or by mail the materials that are most appropriate for their own students. Materials are shipped to their schools and the teachers decide the schedule when these Energenius lessons and activities are presented to their students. The Energenius program has been implemented by PG&E for more than twenty years. In addition to the existing seven separate units of study, the Energenius Program is developing a Green Career Resource Guide for high school counselors, teachers, and other educators to help them introduce green job and careers to their students.

PEAK Student Energy Actions (PEAK)

The PEAK Student Energy Actions (PEAK) program provides a flexible classroom curriculum to teachers on energy and electricity topics. This program is implemented in both PG&E and SCE territories, and has been in place for nearly 40 years. The program materials are designed for grades 3-7, but primarily reach grades 4 and 5. Teachers who sign up for the program receive a yearlong curriculum of 11 lessons, of which they must teach at least four. Teachers may use these materials as supplemental lessons or integrate the lessons into their yearly science curriculum. These lessons cover more general energy topics such as resources and electricity conduction, in addition to energy conservation. The lessons include hands-on labs and home/school energy action activities with materials from PEAK. Teachers who sign up for the program also must participate in a one-day training session with PEAK staff on using these lab materials. In addition, the program has developed Career Explorer units as part of updated lessons in 2010-2012, but is still in the process of rolling these materials out to all classrooms.

LivingWise

The LivingWise program provides one workbook with several chapters on energy efficiency topics, designed to cover a four-week period. The program targets sixth-grade students specifically. In addition to the classroom workbook, the program provides all participating students with take-home energy savings kits. These kits include items that students and parents can install, such as Compact Fluorescent Lamps (CFLs) and a low-flow showerhead, as well as items to measure energy and water use such as flow rate test bags and toilet leak detector tablets. The lesson plans also discuss ways that students can save energy. The program has been implemented continuously in SCE territory since 2005, and was also implemented from 1999-2001. In 2010-2012, the program lesson plan was updated to include materials on green careers, but the lessons were not rolled out until the 2011-2012 school year.

Green Schools

The Green Schools program is the K-12 energy efficiency education campaign for the Alliance to Save Energy (ASE). The Alliance to Save Energy began in 1977, but the Green Schools campaign was first implemented in SCE territory in 2000. The program has been implemented continuously since then. It emphasizes hands-on lessons and demonstrations for teaching students about energy efficiency, providing equipment both for classroom lessons and equipment to assist in identifying opportunities for energy upgrades at the school. Schools participate in the program for up to two academic years. The program takes more of a "toolbox" approach to lesson planning, requiring participating schools to attend training and development workshops in which they customize their own lesson plans based on what the program is able to provide. It does not, however, have strict requirements for which available lessons the schools use. The program also uses these lessons and demonstrations to promote potential careers in the energy efficiency industry.

4.1.2 College and University Programs

Green Campus

The Green Campus is implemented on 13 campuses in the University of California and the California State University systems.[9] Program staff does not directly provide curricular materials, but instead hires student interns from each participating campus. Each campus has four to six paid student interns, and its own full-time Campus Lead. Student interns work with Campus Leads to develop on-campus projects to either save energy directly or to educate other students on energy efficiency topics. Student interns typically participate in the program for multiple years and develop multiple projects based on their annual goals (set by Green Campus program staff).

4.1.3 High School and Community College Programs

Green Pathways

Green Pathways is an online curriculum aimed mostly at high school and college students interested in careers in environment/sustainability. It is open to the public, and energy/sustainability professionals are specifically encouraged to join to serve as mentors to participating students. The site also advertises its ability to put students in contact with professionals in fields of interest, and help students build their professional networks as well as identify possible career paths. The site offers discussion forums centered on both environmental/sustainability issues and career issues. The program is new and was still in the pilot phase during this evaluation.

Community College (DEEP)

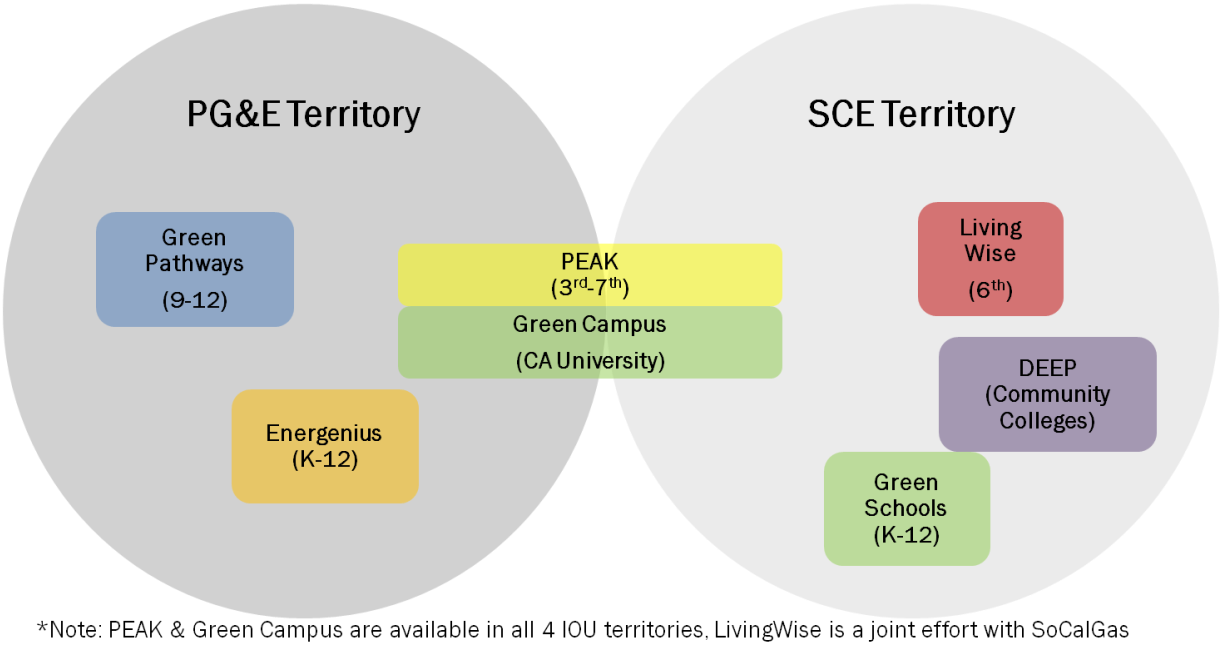
Developing Energy Efficiency Professionals (DEEP) is an entirely new program first implemented at community colleges as a pilot in the fall of 2011. DEEP is an employment development program designed to train and educate community college students in the areas of energy efficiency and demand-side reduction. The program plans to achieve this through classroom learning (infusing

[9] The program is also implemented on three additional campuses in Sempra territory that are outside the scope of our evaluation.

sustainability into existing classes and curriculum), projects, and outreach within the campus community. Along with preparing students for green careers, the program also aims to reduce operational costs for the participating community college campuses by promoting the understanding of demand response, resource conservation, and carbon emission reduction.

Figure 1 shows the reach of each program by IOU territory.

Figure 1. WE&T Connections Programs by IOU Territory



*Note: PEAK & Green Campus are available in all 4 IOU territories, LivingWise is a joint effort with SoCalGas

4.2 STRATEGIC ALIGNMENT

The Strategic Plan was publicly released in 2008, and updated in January 2011, to "create a framework to make energy efficiency a way of life in California by refocusing ratepayer-funded energy efficiency programs on achieving long-term savings through structural changes in the way Californians use energy".[10] The Strategic Plan outlined a plan specifically for WE&T with a vision that "by 2010, California's workforce is training and fully engaged to provide the human capital necessary to achieve California's economic energy efficiency and demand-side management potential".[11] The Connections Program should contribute to the WE&T vision by striving to achieve the two goals set for this sector:

1. Establish energy efficiency education and training at all levels of California's educational systems; and
2. Ensure that minority, low-income, and disadvantaged communities fully participate in training and education programs at all levels of the DSM and energy efficiency industry.[12]

[10] *California Long Term Energy Efficiency Strategic Plan,* January 2011 Update, Section 1, Page 1.

[11] *California Long Term Energy Efficiency Strategic Plan,* January 2011 Update, Section 9, Page 70.

[12] Ibid

Following the initial Strategic Plan publication in 2008, the CPUC directed a Needs Assessment study published in 2010. To better align with the Strategic Plan's vision and goals for WE&T, the Needs Assessment study recommended the following to the Connections Program:

- ***"Career Development and Environmental Integration in K-12 Programs:*** Increase the emphasis on career awareness and career exploration in ratepayer-funded education programs serving K-8 students and support career preparation programs in career academies and Regional Occupational Programs. Evaluate and work toward the integration of environmental and ratepayer-funded energy curricula. There is substantial evidence that the integration of environmental and energy curricula will increase the support of teachers for these programs. These efforts should be supported by strong collaborations with K-12 schools, particularly those programs, like the California Partnership Academies, that target disadvantaged students."[13]

- ***"Evaluation of K-12 Programs***: Work with education agencies, schools, and funding partners to allow for the collection and reporting of demographic information on students participating in ratepayer-funded Connections education programs. The present lack of information hampers the evaluation of existing programs."[14]

4.2.1 CHANGES MADE FOR STRATEGIC ALIGNMENT

WE&T Connections sub-programs (hereby referred to as "programs") made program alterations quickly in response to Strategic Plan and Needs Assessment. Given that most programs were already integrating environment and energy curricula and held strong relationships with K-12 schools and California Partnership Academies[15], the key changes that programs had to make were integrating career elements into their curricula, and determining a way to target efforts to low-income, minority and disadvantaged groups. Program developers embraced directives to incorporate career elements into their curriculum and began developing materials during the 2010-2012 cycle. The programs also shifted participation targeting and requirements to include and track Title 1 and School Lunch program schools.[16] Figure 2 shows when the programs began incorporating career awareness elements and better targeting to reach more disadvantaged students.

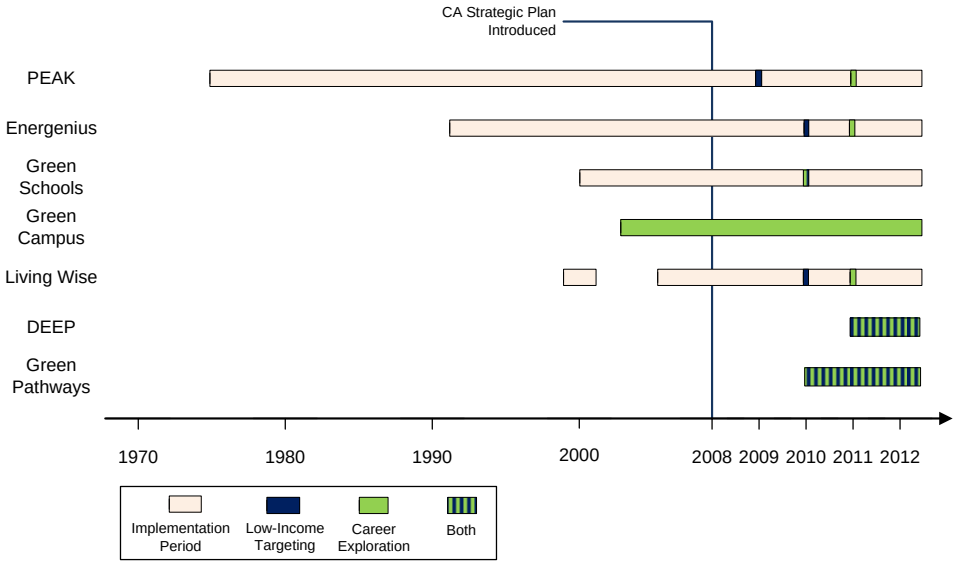
[13] Needs Assessment, pp. xxvii.

[14] Needs Assessment, pp. xxvii-xxviii.

[15] Green Schools works with Green Academies when they are part of a participating district. Green Pathways is working with Green Academy students to help guide their program design.

[16] Because our data collection period was December 2011 to February 2012, many of the participants we spoke to participated in the 2010-11 school year and were not able to speak to any new program elements provided in 2012 (i.e., career awareness).

Figure 2. Timing of Career Awareness and Disadvantaged Targeting



The following are examples of the changes that some programs made to incorporate career awareness into the K-12 curriculum:

- PEAK developed a Career Explorer guide in 2010. This guide is a supplement to each unit and includes a list of 2-4 careers related to the topic of the unit. Information includes a brief interview with one person in one of the listed career fields about what they like about their job, their career background, and how their job helps the environment.

- Energenius is currently developing the Energenius Green Career Resource Guide, which is still in draft form as of 2012. The guide is intended as a resource for high school teachers, career counselors, and other educators. This guide is geared toward older students than most of the Energenius curriculum (grades 7-12 rather than K-12) and includes a general introduction to green jobs, including statistics on demand for different job types. The guide provides a list of 26 career types in eight fields with overall descriptions and the steps needed to obtain the job. This list mostly focuses on construction, technical, and engineering jobs.

All programs have added low-income and minority participation targets, but the metrics used for measuring participant demographics varies by program. Table 5 provides the different definitions. Programs do not see a way to collect more student demographic information from schools due to protection of minor privacy.

Table 5. Demographic Targets and Strategies by Program

Program (Year Added)	Low Income Target Definition and Strategies
PEAK (2009)	Target Title 1/ School Lunch Program Schools (at least 40% of student lunch programs at school)
Energenius (2010)	Goal of 50% of participants. Students enroll in Title 1 School
Green Schools (2010)	Goal of 50% of participant schools in Low Income (LI) communities based on school lunch [unclear on % reg]

Program (Year Added)	Low Income Target Definition and Strategies
Living Wise (2010)	40% of schools reached; each must serve low-income (Title 1 or School Lunch)
Green Campus	Does not currently target anyone based on LI for intern positions; interns communicate broadly to entire campus, unclear as to how to incorporate their goal and whether it should apply to this program
Green Pathways (2010)	Does not have formal goals outlined, but conducted outreach in Title 1 schools, as well as YMCAs and Boys and Girls Clubs Have some integration with classrooms through green academies Also mentioned challenges to meeting this requirement and they are not sure that it should apply to their program
DEEP (2011)	Developed specifically for community colleges in response to Needs Assessment, believe targeting community colleges meets the goal of serving low-income and disadvantaged due to student enrollment characteristics

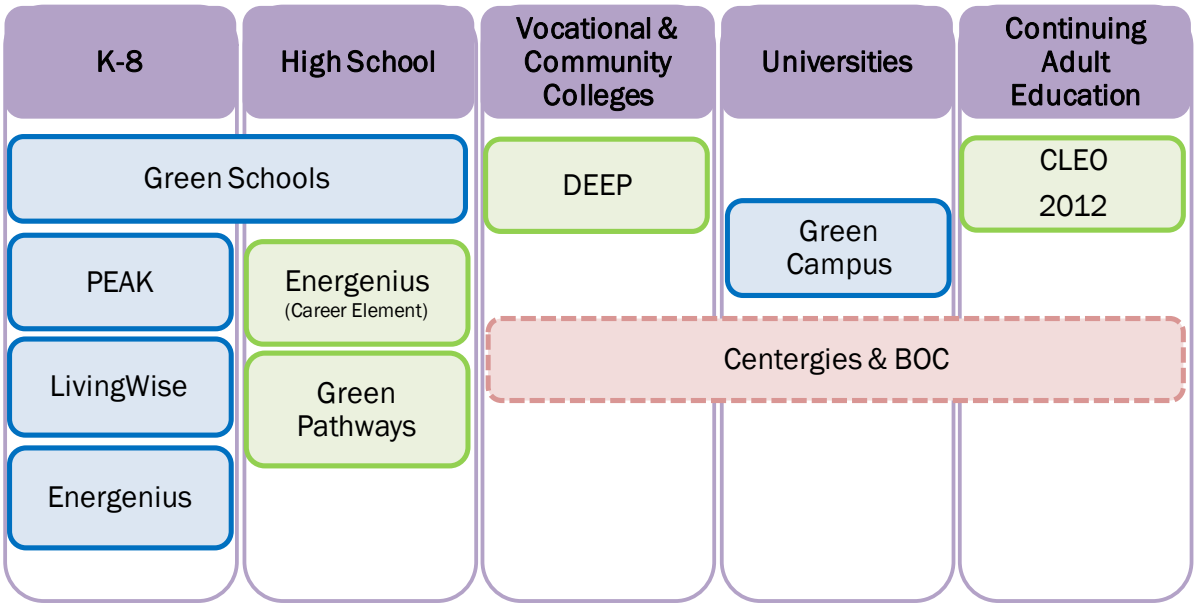
The WE&T Connections program contributes to the Strategic Plan's WE&T goal of "establishing energy efficiency education and training at all levels of California's educational systems." Prior to the Strategic Plan, the IOUs had programs that addressed most education levels; however, there was a clear gap in addressing the high school level more directly with a workforce preparation program and in addressing the community college level with a program that catered to the varying needs across community colleges. Therefore, two new programs were created in this program cycle to fill these gaps.

- **DEEP** is a new program that started in the 2011-2012 school year targeting community college students. It is working with three schools in California to test three different approaches to working with community colleges. As of the process evaluation, this program was still in the pilot phase. Please refer to the Appendix for detail on the three approaches and other design and implementation plans.

- **Green Pathways** is a program designed specifically for high schools. It was still in the proof-of-concept stage during this evaluation. This is an online-based course that creates a community to connect high school students with subject matter experts who can help them make green education and career decisions. It is designed to educate students on careers and energy efficiency concepts. Program staff worked with three schools during the 2011-2012 school year and gained input from green academies on program design. Please refer to the Appendix for detail on the program's initial design and how it evolved through this evaluation period.

Figure 3 shows the education levels targeted by the WE&T programs. Programs outlined in green were in the early stages of implementation during this evaluation. Program outlined in red are part of the WE&T Centergies sub-program. Note that some of the programs (CLEO, Centergies, and BOC) in Figure 3 are not under the "Connections" umbrella of programs covered in the evaluation report but are shown to illustrate that there are other programs that address these levels in California's educational systems.

Figure 3. WE&T Programs by Target Education Level



Note: There are many non-WE&T funded IOU efforts that also target Cont. Adult Edu at the Centers such as BPI and HVAC Quality Install Training

One program implementer noted that "the greatest impact we can have is on the existing curriculum offered statewide at all levels of the educational system". It is believed that the most cost-effective and sustainable method of reaching all levels in the education system is to embed energy efficiency concepts into the standard curriculum across the state and at all level of the education system. Changing and updating curriculum throughout the state education system is a lofty task, one that requires a large amount of collaboration, support, and decision-making from multiple educational institutions and the California Department of Education. This kind of effort will likely have to be championed by a collaboration between the IOUs, curriculum designers and the CPUC. In the meantime, the programs are making strides in this direction. For example, most K-12 programs work to ensure that their curriculum meets California Statewide Content Standards so that they can serve as models for the California Department of Education to consider in a statewide rollout of energy efficiency education. IOU staff has also starting conversations with the California Department of Education on this topic. The Community Colleges' Chancellor's office wants the DEEP program to help them create a standardized curriculum in energy efficiency at community colleges. The Green Campus interns work with faculty at each California State and University of California (UC) campus to integrate energy efficiency into the classroom syllabi. Green Campus staff is also working with high-level campus administrators to develop a statewide college curriculum.

4.3 K-12 Findings

This section outlines our key findings across the four K-12 Connections programs (Energenius, PEAK, LivingWise, and Green Schools).

Overall, we found that all of the programs are bringing new energy saving concepts into schools and classrooms that would not have been taught otherwise:

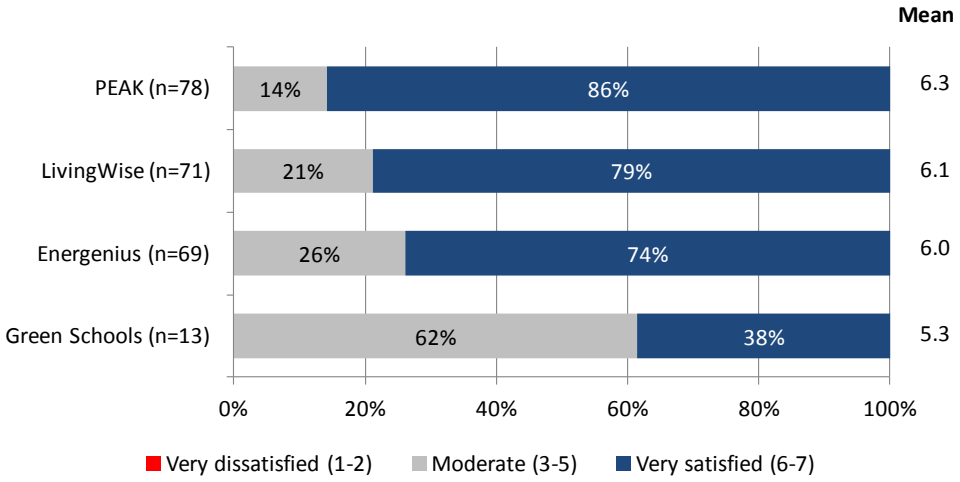
- 57% of the schools or districts touched by the program self-report that they had not provided education on energy efficiency or energy conservation outside of the program.
- 43% of teachers had not taught students about energy efficiency or conservation outside of the program.

The large majority of educators touched by the programs (74% to 79% depending on the program) also strongly agreed that students are learning about ways to save energy through the offerings.

As such, each is providing some value in delivering education on energy efficiency. However, there are also important differences in the programs in terms of who they reach, educational content, the requirements of the educators, teaching methods, and the intensity of program support required.

Overall satisfaction also varies somewhat. Generally, overall satisfaction was good in three of the programs, and moderate in the fourth (Green Schools), as shown in Figure 4.

Figure 4. Overall Program Satisfaction (K-12 Programs)



In the sections below, we outline differences in the programs in terms of who they reach, educational content, the requirements of the educators, teaching methods, and the intensity of program support required.

4.3.1 CONTENT OF K-12

Students in K-12 schools are the next generation of residential customers in California. The California Strategic Plan's vision for the residential sector is:

> "Residential energy use will be transformed to ultra-high levels of energy efficiency resulting in Zero Net Energy new buildings by 2020. All cost-effective potential for energy efficiency, demand response and clean energy production will be routinely realized for all dwellings on a fully integrated, site-specific basis."[17]

[17] *California Long Term Energy Efficiency Strategic Plan,* January 2011 Update, Section 2, Page 9.

As such, it is important that these programs attempt to increase students' knowledge of integrated demand-side management by covering energy conservation, technologies, demand response, and renewable technologies to the extent that is appropriate by grade level. We found that all programs effectively address energy conservation and efficient technology; but support for other energy topics varies. As indicated by the stars in Table 6, when a program addressed an energy topic, it generally did a good job of developing relevant concepts.

Table 6. Program Development of Energy Efficiency Concepts in Materials (K-12) [A]

	Energenius	PEAK	LivingWise	Green Schools
Energy Conservation	★★★★	★★★★	★★★★	★★★★
Efficient Technology	★★★★	★★★★	★★★★	★★★★
Demand Response; Time of Use	na Planned for 2012 [B]	★★★½	★★☆☆ [C]	na
Renewables; Self Generation	Planned for 2012 [D] ★★★☆	★★★★	★★★½	★★★☆

[A] Specific criteria associated with concept development in each of the topic areas include things such as: Positions the importance and associated benefits; Addresses relevant measures and actions; Includes examples of impact and benefits of relevant measures and actions; Includes specific and relevant calls to action

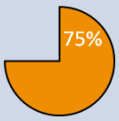
[B] Some "extended learning opportunity" lessons in Energenius do address demand reduction and the importance of reducing load during peak demand periods. However, the review of materials focused specifically on "mainstream" lessons, and did not include a thorough review of "extended learning opportunities" or equivalent.

[C] Although LivingWise does not address demand response or time of use, it does address the importance and benefits of sustained demand reduction.

[D] The review of materials indicates that several "older" Energenius modules (Energy and Me, Energy Check-up for the Environment, and Light Right) address renewable energy sources, as does one of the "newer" (still-in-development in early 2012) modules (Transportation, Energy, and the Environment).

The Needs Assessment suggested that the programs increase emphasis on career awareness and career exploration. Each program takes a different approach to addressing "green jobs" and focuses on different types of careers, as shown in Table 7.

Table 7. Integration of "Green Career" Lessons by Program (K-12)

Program	How	Types of Careers
Energenius 	• Web-based activities related to green work/economy • Developing Green Career Resource Guide for high school counselors and teachers (currently in specification or early draft form) • Developing green career supplements for existing units (in review stage, planned for late 2012)	Multiple as age appropriate: Examples include: Technicians, contractors, agriculture, project planning and mgmt, gov't regulators
PEAK 	• Career profiles with career pathways discussion • Proposed coordination of special speakers • Rolled out school-wide Green Career Assemblies and Green Careers Classroom Presentations • Career Shadowing Field Trips	Multiple (includes wildlife biologist, technicians and engineers, gov't regulators)
Living Wise 	• Job-related profiles infused into general lesson topics	Home energy auditor, thermal engineer, hydrologist
Green Schools 	• Guest speakers for school • Career fairs • Student Energy auditor training (SEAT) • Lays groundwork for career in energy-related field	Energy auditors (for SEAT participants), utility representatives, engineers, scientists, non-profits, contractors (sugg. for career fairs)

[A] The pie charts indicate how well the materials address specific topics related to Green Careers: Personal benefits associated with green careers; Benefits to environment/ society associated with green careers; Role models in green careers; Pointers to approaches or next steps to developing a green career.
[B] The Green Career Resource Guide currently is in the specification or early draft form. The green career supplements for existing units are in the review stage, planned for late 2012.

To ensure academic acceptance, the program curriculum must comply with California Content Standards. Three of the offerings (Energenius, PEAK, and LivingWise)[18] are very well aligned with Content Standards for California Public Schools; Green Schools has room for improvement. Notably, many of the teachers are not teaching the Green Schools curriculum but are instead focusing on the project aspect of the course. All programs had summary information mapping lessons to the Content Standards. Green Schools scored low on several of the criteria associated with this dimension due to the lack of consistent performance-based objectives. All the programs provide a clear mapping of lessons to specific entries (performance objectives) in the California Content Standards for California Public Schools. With the exception of Green Schools, each program's lessons include objectives that directly correspond with the Content Standards. (For Green Schools, the lesson objectives tend not to be performance-based behavioral objectives and therefore cannot be directly mapped to the Content Standards. See note "A" under Table 8.)

[18] Although LivingWise scores very well on the "Alignment with Content Standards" dimension, it is worth noting that one weak area surfaced when looking at individual criteria.

To verify that the materials actually do support the Content Standards (rather than just provide tables indicating that they do), the instructional design team did a "spot check" of approximately 25% of the cited linkages in all units of instruction for each program. We found that the stated linkages between the lessons and the Content Standards are accurate. That is, the lessons really do support the Content Standards as described in the program material.

Table 8 provides the complete ratings for Alignment dimensions.

Green Schools teachers expressed concern about lesson plans meeting state education standards, since they must develop these materials on their own based on Green Schools suggested materials rather than pre-designed and standards-compliant lessons. One teacher pointed out that teachers must *"verify and modify [lessons] for compliance,"* and another mentioned that they did not develop lesson plans at all due to concerns about the lessons' standard compliance.

All the programs provide a clear mapping of lessons to specific entries (performance objectives) in the California Content Standards for California Public Schools. With the exception of Green Schools, each program's lessons include objectives that directly correspond with the Content Standards. (For Green Schools, the lesson objectives tend not to be performance-based behavioral objectives and therefore cannot be directly mapped to the Content Standards. See note "A" under Table 8.)

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Table 8. Alignment with Content Standards by Program (K-12)

Alignment with Content Standards criteria	Energenius	PEAK	LivingWise [B]	Green Schools
Overall score on "Alignment with Content Standards" dimension				
Dimension-specific scores				**100% = "perfect score"**
Lessons and activities are targeted to specific grade levels	100%	100%	100%	100%
Lessons and activities map directly to "Strands" or "Disciplines" defined in Standards	100%	100%	100%	0% [A]
There is a clear, logical linkage between lessons and activities to Standards goals (specified for each strand/discipline)	100%	100%	100%	0% [A]
Materials conform to EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria for Science [C]	98%	96%	90%	64% [A]

[A] The Content Standards for California Public Schools notes specific performance-based objectives for each grade in each subject area. The objectives noted in the Green Schools materials generally are not performance-based. It is difficult to map "increase awareness" or "think critically" or "establish their own opinions" or similar non-performance-based objectives to the specific criteria cited in the Standards. (Performance-based objectives specify what the student will do to demonstrate mastery of the targeted knowledge and skills.) There are also

several "sub-criteria" associated with conformance to EEI criteria, based on the specific criteria listed in the EEI documentation. See below for details.

[B] Although LivingWise scores very well on the "Alignment with Content Standards" dimension, it is worth noting that one weak area surfaced when looking at individual criteria. The EEI Instructional Materials Evaluation Criteria for Science includes the criterion: "Support the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards." Because LivingWise activities are generally optional and are often teacher-led, students may not have the opportunity to develop investigative and experimental skills, which generally require active, "hands-on" involvement.

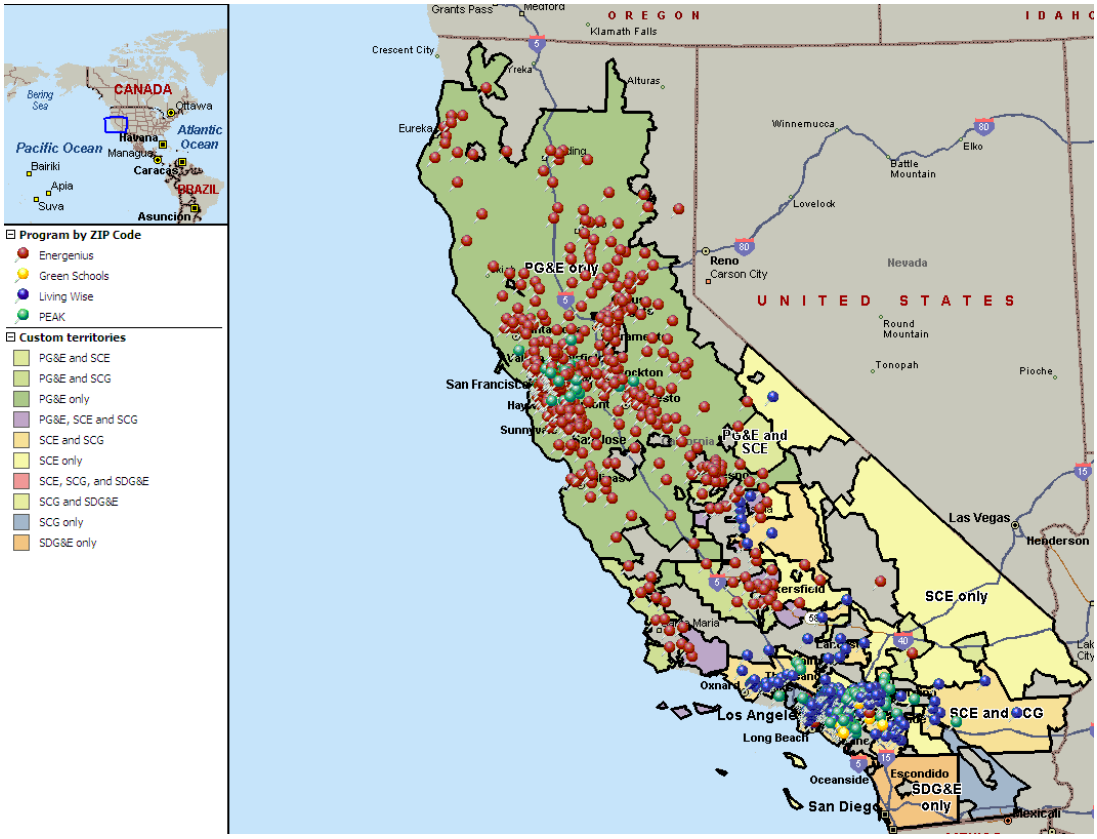
[C] Sub-criteria for "Conform to EEI Criteria": The following sub-criteria are based on the criteria listed in the EEI evaluation documentation. (See http://www.cde.ca.gov/ci/sc/ee/eeievalcriteria.asp for details.) See the "Detailed Yardstick Findings" in Appendix A: Detailed Program Findings for details.

Overall, we found that the Connections programs are generally doing a good job of aligning with content standards, and should continue to strive to do so. However, the Green Schools curriculum would need to be enhanced to better meet standards. As such, utility administrators should consider whether to invest in enhancing the curriculum to better meet standards, or instead encourage the Green Schools program to only offer curriculum suggestions that demonstrate how they meet certain standards.

4.3.2 REACH OF K-12

The programs vary in the grades, educators, and geographies that they target. To date, Energenius (in PG&E territory) and LivingWise (in SCE territory) have shown that they can reach the most geographically broad populations. PEAK (across both territories) is more focused, reaching large numbers but in areas where program staff are able to train, while Green Schools is very limited in its reach. Figure 5 shows the locations of participating schools by program statewide. Reach numbers in terms of schools, teachers, and students are located in the Appendices for each program.

Figure 5. Locations of Participating WE&T Connections Schools by Program [a]



[a] Key: Red - Energenius, Yellow – Green Schools, Green – PEAK, Blue - LivingWise

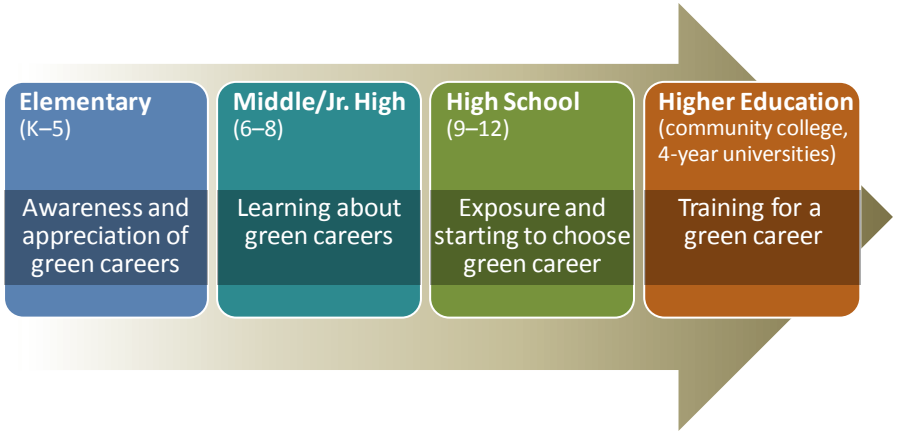
In terms of grade level and teachers reached, Energenius, PEAK, and Green Schools currently are designed to be able to be used by multiple grade levels, while LivingWise is more focused on specific grades. In general, the 3rd-8th grades are covered well by current program offerings. Table 9 summarizes the different geographic, grade level, and educator reach by program for the four K-12 programs.

Table 9. Summary of Target Groups by Program (K-12)

	Energenius	PEAK	LivingWise	Green Schools
Grades	K–8, 9–12 • Grades 9–12 Green Careers unit (in-development) • Each unit targeted to different grade levels	4–5 (3, 6, 7) • Allows for broad coverage of grade levels (3–7) but primarily 4–5 • All lessons "targeted" to all grade levels	6 (4, 5) • Primarily 6th grade, but some teachers in other grades	K–12 • Small groups of targeted students; whole districts participate • Many identical lessons between "primary" and "secondary"
Educators	Elementary and middle school teachers Often recruited through Energenius	Science teachers and general subject teachers Hear about program through PEAK staff or colleagues	Science and general subject teachers Often looking for supplemental educational materials	School districts, range of individuals — including facility staff District assigns staff to program teams
Geography	Broad reach in PG&E territory	Large numbers but focused to where program staff are located	Broad reach in SCE territory	Small population (3 districts but many schools in district)

While the 3rd-8th grade levels seem adequately reached through current program offerings, the high school 9-12th grade level may need a closer look. While elementary and middle-school students may benefit from a general awareness and appreciation for energy efficiency and green career, the high school level provides an opportunity to expose students to careers and help connect them to resources for continuing education or starting a job at an age when students are starting to think about their next career or education step after high school. Figure 6 illustrates the differing levels of career education and training needs by each education level. Elementary school students need only very basic information, while community college and 4-year college students need specific career training. Notably, it is challenging to get energy efficiency and green career education into the existing high school curriculum because it is difficult to place it in a specific subject, and high schools are primarily focused on courses for SAT preparation or AP exam preparation.

Figure 6. Level of Career Education Needs by Education Level



High school students are mostly underserved by the current programs even though some WE&T programs are updating existing programs to address this need.

- Green Schools is already working with some high schools. Because of the flexible nature of the program, the schools can incorporate the green career element in a number of ways. Some schools have had green career professionals speak at school assemblies. This may increase the students' awareness of green careers but does not provide any resources for students to explore their options.

- Energenius is working on the Energenius Green Career Resource Guide as a resource for high school teachers, career counselors, and other educators to provide information to their students. This is a good awareness-building resource but does not provide any real exposure to green careers or the education or career options available to the student to start a green career.

- The Energenius and Green Schools program components that reach high school students are geared toward giving supplemental curricular resources and they are more informational or awareness building.

PG&E has been working on a potentially new program entirely designed to reach high school students. The Green Pathways program is both a curricular resource and a workforce development program. Its vision is to integrate career preparation for high school students interested in a green career. It aligns well with the Strategic Plan and Needs Assessment because this program is geared toward workforce development for high school students. Our review of Green Pathways found that it shows promise in supporting green careers because it provides core career preparation, awareness building, and linkage to educational and career resources. Below are a few key strong points in the current Green Pathways program design:

- It is one of the only IOU high school targeted Connections programs that is leveraging the online environment and social networking trends in education. It is unique in that it is utilizing online learning and communication. By utilizing an online education method, it has good scalable potential across the state.

- The program can easily link to and leverage other Connections programs to help other Connections programs that reach high school students further provide a career preparation resource. The program can also leverage the Energenius Green Career Guide by including an online version of the guide on its website, as this is a great resource for high school students. The Green Schools program could also enhance its green career focus by encouraging the high school students it reaches to participate in the Green Pathways program. It also has the potential to link to the Centergies programs and IOU resources by providing Green Pathways students with access to those experts and potentially providing the education needed to serve as interns and/or employees for the Centers or IOUs. Students in 11th and 12th grade are looking for mentors, internships, and part-time and full-time jobs. Green Pathways can help link these students to mentors and job possibilities. Green Academies and New Academies has a requirement for internships, and Green Pathways can help these students find them by connecting them to the right people and giving them the skills for how to search for an internship and build relationships.

- This online program can easily be incorporated into clubs or after-school programs, or be incorporated into the school day during the end of the school year, post SAT and AP exam taking.

- The program has flexibility for teachers to structure it; they can do in one consolidated or condensed period of time or span it out over a semester or a few weeks.
- Students can use their experience to demonstrate that they have learned something in the area of energy efficiency that can help them get jobs or into schools (e.g., an online profile that shows all the work they have done in the green field). The program is also considering how students can get a certificate after completing the course and potentially how the course can qualify for credit towards community college.
- The building of an online community allows for collaboration and partnerships between educators, students, business, industry, government, and non-profits that can help give high school students information, skills, and resources to find a green career path.
- With the lack of guidance counselors in high schools due to budget cuts, the program can provide online green career coaching for students. It gives students access to green gurus and career coaches to help them explore careers and helps them think through how they can make decisions about what to do after high school.

Please refer to the Appendix for more details on the Green Pathways evolving program design.

4.3.3 REQUIREMENTS OF EDUCATORS

The programs reflect a range of teacher commitment and hours of instruction. While all of the programs offer teachers some flexibility, the level of commitment generally ranges from very flexible and completely driven by the teacher (Energenius), to the option of integrating into a full-year educational program (e.g., PEAK and Green Schools). Table 10 summarizes the requirements of educators by program.

Table 10. Teacher Requirements by Program (K-12)

	Energenius	PEAK	LivingWise	Green Schools
Grades	K–8, 9–12	4–5 (3, 6, 7)	6 (5)	K–12
Educator commitment	Flexible time commitment for teachers	Commitment ranges from four lessons to full year	4 week commitment whenever teachers want to teach	Long-term commitment (one or two school years)
Teacher training/support	Limited	Moderately intense	Limited	Intense: Ongoing coaching/support
Mean estimated "teacher hours" required per lesson [A]	2.3 hours [B]	1.8 hours	1.8 hours	2.8 hours
Mean hours of instruction delivered (self reported by teachers)	12 hours	22 hours	12 hours	34 hours [C]

[A] Estimated "teacher hours" is based on a review of materials and reflects the instructional design team's estimate of the instruction time and teacher preparation/follow-up time — not the estimated lesson time shown in the materials.

[B] Estimates for Energenius "teacher hours" does not include the lessons for grades K–1, nor "Let's Do an Energy Patrol," as these lessons are "outliers" and not reflective of the typical Energenius lessons.

[C] The majority of Green Schools teachers indicated that they did not teach the lessons provided through Green Schools or develop their own related lessons. Rather their efforts were focused on working with the school teams to implement projects that would reduce the school's kWh.

Sometimes there is a significant difference between the Evaluation Team's estimate and the lesson times shown in the teacher materials, especially for LivingWise.

For example, consider the LivingWise "Conservation at Home" lesson. In addition to an introductory teacher-led discussion based on student reading, in-class activities have students doing the following: conduct lamp activity, tour school, create a presentation for other classrooms, and get oriented to the LivingWise kit (which students take home and use to conduct numerous activities). The estimated in-class time for this lesson shown in the teacher guide is 20 minutes. The Evaluation Team's estimate for this lesson is 1.5 hours of instruction time, plus 0.25 hours of teacher preparation/follow-up time. (This actually is a conservative estimate of required teacher time.)

Table 11 shows the level of commitment required at each level of program participation: districts (if applicable), teachers, and students.

Table 11. Level of Commitment Required for Districts, Teachers, and Students (K-12)

	District	Teachers	Students
Living Wise (6)		1-month curriculum Teachers order through Living Wise website or by phone, receive materials by mail	Take direct install measures home to save energy at home
PEAK (3-7)		Teachers attend 1-day training Commitment ranges from four lessons to full year; Teachers re-enroll annually	Students learn about EE and resources in class
Green Schools (K-12)	Gain participation from district, commit to saving energy at school for incentive	Teachers attend orientation 1-year commitment to save energy at school, develop lessons, and hold events	School audit Become energy patrollers on campus
Energenius (K-12)		Teachers sign up for materials on website or at conferences. Curriculum includes teaching procedures and all materials needed for students.	Students learn about environment and EE in class

4.3.4 Level of Support for Teachers

Energenius is least dependent upon personal interaction with and guidance from program staff, essentially letting teachers "go it alone" with the materials provided. LivingWise does not provide special training sessions, but does include written instructions and supplementary online materials. PEAK includes a one-day training session that trains teachers on how to use the hands-on lab materials. Green Schools is most dependent on ongoing guidance and support from program staff, with face-to-face interactions throughout the year. All programs except Energenius depend on materials and/or equipment provided by the program.

Table 12 summarizes the level of support provided and needed by each of the K-12 programs.

Table 12. Level of Support Provided and Needed by Program (K-12)

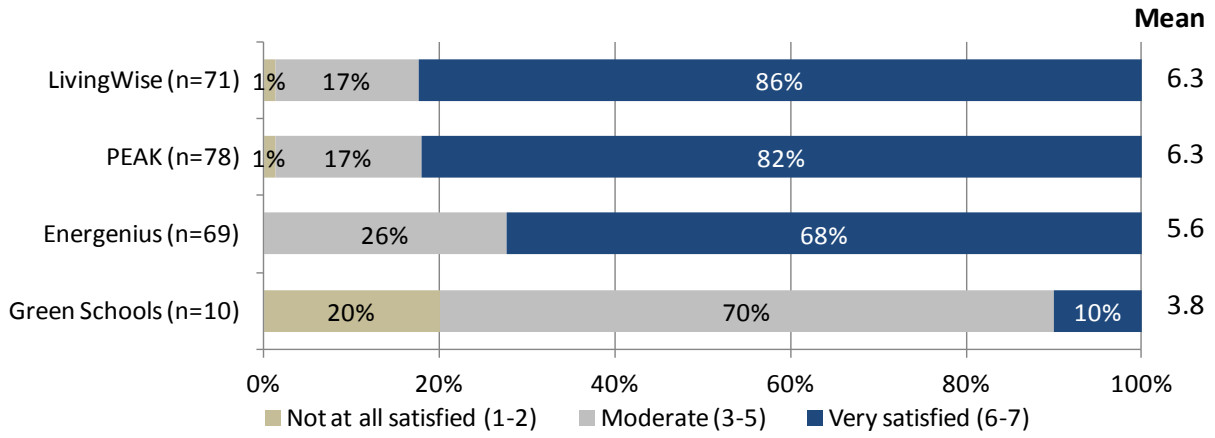
	Energenius	PEAK	LivingWise	Green Schools
Level of school interaction with program staff	Low	Moderate to low during the school year; meet with staff annually to continue participation	Moderate to low	High interaction with program staff throughout the year, including district-wide meetings each semester
Training	Written instructions included with workbooks	One-day in-person training session with PEAK staff to review lessons and practice with hands-on lab materials	Written instructions included with workbooks; also offers supplemental information online	In-person workshop with all teachers from district to learn program and develop savings and student activity plans for year
Necessary materials	• Teacher guides • Student workbooks	• Teacher guides • Comprehensive tool kit including materials and equipment for hands-on projects	• Teacher guides • Student workbooks • Take-home Kits	• Teacher guides • Tool kit

Our evaluation found that the level of teacher training and support is generally good, but Green Schools needs to update its teacher training to be more effective. Most teachers interviewed were satisfied with the level of preparation they received (see Figure 7). The Green Schools mean score was lower, but we note that the sample size was also much smaller. However, the training issues that teachers discussed during our interviews were consistent with issues we found while observing the training. One training issue that Green Schools teachers mentioned was that all teachers per district are taught in one session, regardless of what grades they teach. This meant that high school and kindergarten teachers received nearly identical training and materials, even though their classroom needs are very different. Team members who worked at high schools were especially likely to call out a need for separate training; one described the training as *"too elementary school focused."*

The majority of the Green Schools teacher orientation session was focused on the (financial) benefits of and logistical requirements for participating in the program rather than what teachers need to know and do to use the program materials to teach their students effectively. Although there was one activity where teachers were asked to navigate through portions of the materials to identify linkages to the Content Standards, it was poorly executed as many of the participants expressed confusion and frustration. Virtually none of the session focused on what teachers can and should do with their students to provide meaningful learning opportunities in the classroom.

The PEAK teacher orientation session was well organized and showed a good balance between addressing logistical issues and actively involving the teachers in the types of activities they would be leading with their students. However, because of time constraints, it was not feasible for teachers to get appropriate coaching and hands-on practice with most of the activities, so many of the teachers might be challenged when trying to conduct these activities in the classroom.

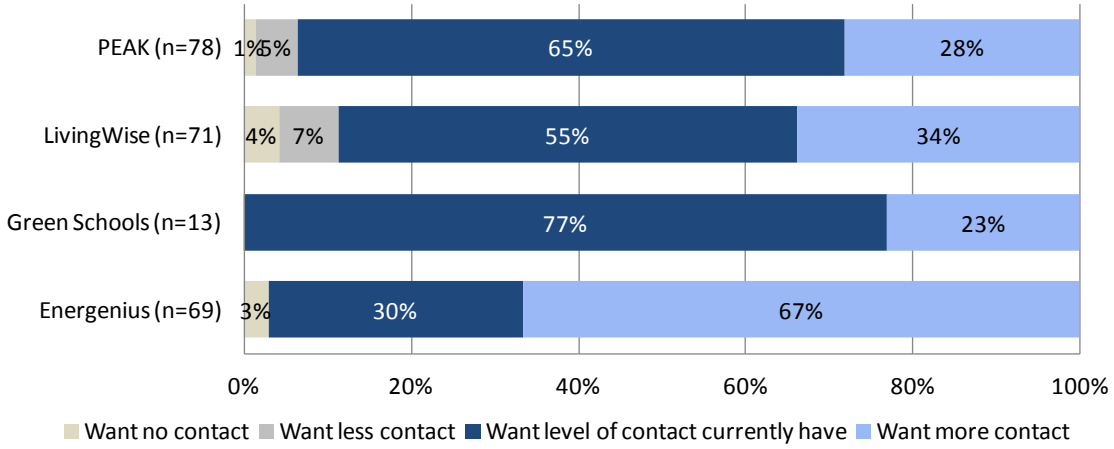
Figure 7. Level of Satisfaction with Training for Preparing to Teach Lessons by Program (K-12)



We also explored the type of training that teachers want. Our teacher surveys found that most PEAK (68%) and Green Schools (54%) teachers wanted in-person training, which they are already receiving. LivingWise (45%) and Energenius (54%) teachers generally preferred online video based training, which programs do not currently offer.

We also explored how much contact the teachers wanted with program staff. Our surveys found that teachers' current level of contact with programs is generally good. About half (52%) of respondents overall said that they were satisfied with the amount of contact they had with program staff. Respondents were most likely to say that they wanted to contact the program once per semester to once a year. Energenius teachers want a little more contact or support from the program – currently only 10% have ever contacted program staff. Figure 8 summarizes wanted contact by program.

Figure 8. Level of Staff Outreach Wanted by Program (K-12)



This data indicates that there is need for some programs to change the content of existing training, start to provide more training, and potentially change the way training is provided (online versus in-person or via telephone upon request).

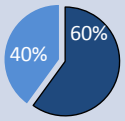
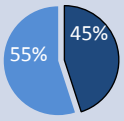
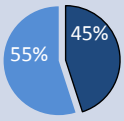
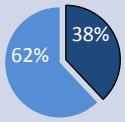
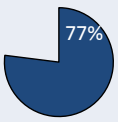
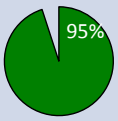
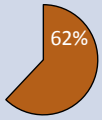
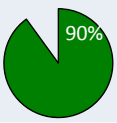
4.3.5 TEACHER PROGRAM DESIGN PREFERENCES

Given that there are four programs that target students in K-12, we tested the elements of each program's design with teachers as part of our survey effort. We found that different designs support different teacher preferences for delivery. There is a clear split in the type of programs that teachers desire (i.e., supplemental and more flexible versus integrated and more structured). Based on teacher responses, teachers have different preferences for how to integrate lessons into the curriculum. Some teachers prefer individual lessons that can easily be integrated into their curriculum (such as PEAK) while others prefer supplemental units (similar to Energenius design). As such, there is more than one good design, and offering both will allow the programs to reach a broader number of schools and teachers.

When educators were asked about the difficulty of integrating the program into their curriculum, they perceived PEAK as the easiest to integrate, while they perceived Green Schools as the most difficult to integrate. The Green Schools program provides a Road Map guide rather than pre-developed lesson plans in the vein of the other K-12 programs. Many interviewed teachers said they would prefer to receive pre-designed materials that can be used immediately rather than develop their own lessons based on Green Schools' suggested materials. Teachers who developed lessons said that the Green Schools materials were *"not easy to use"* and they wanted something *"easy to integrate into the curriculum rather than create new lesson plans from scratch."* Teachers also mentioned that this created additional burdens for them in terms of time spent researching and developing lesson plans.

Table 13 illustrates teacher preferences for and the Evaluation Team's ratings of the materials' design across the four K-12 programs.

Table 13. Program Design Preferences and Evaluation Team Ratings by Program (K-12)

Implementation Support Criteria	Energenius	PEAK	LivingWise	Green Schools
Teachers' preferred approach Integration / infusion into curriculum Supplemental / as-needed				
Ease of integration (teachers' perceptions) Easy to integrate				
Materials design for ease-of-use (implementation support)				
Materials design for flexibility (implementation flexibility)				

Note: Figures in blue indicate ratings that are based on teacher reports from our surveys. Figures in red/orange/green indicate ratings developed by our Evaluation Team based on our direct review of the materials.

Given the varying teacher preferences, the WE&T Connection program should continue to offer multiple program designs that appeal to varying teacher preferences, such as intensive and prescriptive offerings (e.g., PEAK) and supplemental offerings (e.g., Energenius).

4.3.6 TEACHING METHODS AND LEARNING EFFECTIVENESS

Each program also takes a different approach to organizing and presenting lessons and involving students. Energenius and PEAK both actively engage students in the classroom, offering a selection of units and lesson plans. Energenius has limited reading for "content delivery," with the emphasis on activities, while PEAK has more robust readings, followed by activities. LivingWise focuses primarily on in-class reading and at-home activities, with one workbook. LivingWise is relatively low in active student engagement in the classroom. Green Schools focuses primarily on forming student teams who conduct school energy audits and project-based activities.

Learning Effectiveness

- Our surveys indicated that teachers felt the programs did well in terms of learning effectiveness, and the instructional design review of the materials supports the teachers' assessment: All programs, except for Green Schools, have clear and measurable performance-based learning objectives for each lesson, the hierarchy of objectives is clearly delineated, and the objectives correspond with the Content Standards for California Public Schools and the California Environmental Principles and Concepts.

  (While Green Schools lessons do have statements of goals and expected outcomes, they generally do not describe clearly and measurably what the student should be able to do as a result of the lesson.)

- Lessons are designed to support the objectives, they use a variety of media and modes (visual, aural, and kinesthetic), and they recommend reasonable time frames for completion.

- The materials generally reflect a clear and logical structure and use visual cues to help teachers and students navigate the lessons efficiently.

- All programs' lessons, except for Green Schools, have appropriate follow-up comprehension and application questions to help teachers coach the students.

  (Green Schools lessons consistently have application questions, but rarely have questions that would aid teachers in verifying students have comprehended key points of the lesson.)

- Lessons' activities directly support the learning objectives and lesson content, and use a variety of effective approaches to involving the students. However, there are some concerns specific to the LivingWise and Green Schools activities.

  - The majority of LivingWise activities that are not positioned as optional are centered on the take-home kit and are designed for students to do in conjunction with an adult at home. (It may be unreasonable to expect that most students will have an adult at home who is willing and able to support student learning in this way.)

    In addition, students have an activity book in which they are to perform lots of computation (related to energy savings). There is no structured follow-up at school for the students to bring back their books, check their arithmetic, or talk about the at-home process.

- The primary focus of the Green Schools activities is on the Green Schools team. The learning experience of students who are not on this team is difficult to assess.

Among hands-on activities or demonstrations, lab activities were rated as the most valuable type of learning experience. These activities are most ingrained in the Energenius and PEAK programs. Many LivingWise teachers also highly valued the take-home energy kits. Other learning experiences (assemblies, take-home posters, school energy audits) were perceived as less valuable by most teachers.

Therefore, we found that all programs should have at least some hands-on lab activities for students. Furthermore, the WE&T program administrators need to find ways to build in measurement to assess learning effectiveness across all of the K-12 programs. We describe the need for measurement and assessment in the next section.

Table 14 summarizes our findings for the learning effectiveness criteria by program.

Table 14. Learning Effectiveness by Program (K-12)

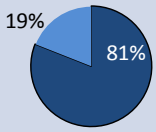
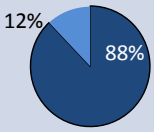
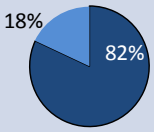
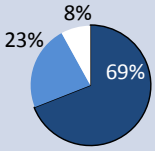
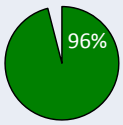
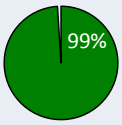
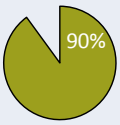
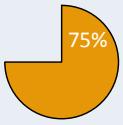
Implementation Support Criteria	Energenius	PEAK	LivingWise	Green Schools
Teachers' perceptions of learning effectiveness Very effective Moderately effective Not at all effective				
Materials design for learning effectiveness				
Primary teaching methods	Primary focus on engage students in class (labs, activities)	Primary focus on engage students in class (labs, activities); secondary focus on at-home activities	Primary focus on home kit; variable in-class experiences	Primary focus on GS team; variable in-class experiences

Table 15. K-12 Learning Effectiveness Scores

Dimensions of Learning Effectiveness	Energenius	PEAK	LivingWise	Green Schools
Objectives	100%	98%	94%	33%
Lesson Design	92%	99%	98%	96%
Activity Design	95%	100%	78%	97%

Appropriateness to the students' age group is another important consideration regarding learning effectiveness. Although this was not a specific criterion on our yardstick, during our review, we noticed that some lessons in PEAK and Green Schools seemed poorly targeted to the typical skill levels of the target age groups.

- While the vast majority of PEAK lessons were clearly age-appropriate, there were a few lessons that seemed too difficult for younger children who were included in the target

audience. For example, some lessons purportedly targeted to grades 3-7 include complex multi-digit multiplication and division, which is "beyond" a "typical" third grader (and at a higher level than indicated by the Content Standards).

- Green Schools has many identical lessons for primary and secondary students. While the general lesson concept may be appropriate for both age groups, some tailoring of the content and design is necessary to be age appropriate. The materials provide no guidance to help teachers adapt these lessons to the ages they are teaching

4.3.7 ASSESSING PROGRAMS

There are several ways to evaluate training effectiveness: (1) interview teachers (done in this evaluation); (2) survey students; (3) review materials for relevant instructional design characteristics (done in this evaluation); (4) observe training delivery; and (5) use objective, criterion-referenced measures (for example, pre- and post-tests) to assess the results.

Criterion-referenced assessments[19] typically give the most meaningful and accurate evaluation.

Although LivingWise and PEAK do include pre- and post-tests, none of the programs have effective measures to test what students have learned from the program's educational experiences. (Energenius and PEAK have good guidance for informal evaluation of how students are doing for each lesson, so teachers can coach and remediate as appropriate.)

Although it was not formally within the scope of this process evaluation, we conducted a brief psychometric[20] review of the pre- and post-tests included in the PEAK and LivingWise materials. This review identified the following issues:

- The tests do not appropriately reflect the lessons' learning objectives, nor do they directly correlate with the California Content Standards that the lessons support.
- Some test items are poorly constructed from a psychometric perspective.

[19] Assuming the "measurement instruments" (tests, surveys, work products) are valid and reliable instruments, criterion-referenced assessments tell you what students actually know and can do as a result of the educational experience. A criterion-referenced assessment is one that is intended to determine whether students have met specific performance-based objectives; that is, whether they have the knowledge and skill targeted in the learning experience. With "perfect" learning experiences, and a "perfect" criterion-referenced test, all students would score 100%. (This is in contrast to a "norm-referenced" test, which is designed to measure whether a student performs better or worse than others in the same group. With a "perfect" norm-referenced test, scores would fall precisely into a bell curve or other mathematical construct.)

[20] Psychometrics is the field of study concerned with the theory and technique of psychological measurement, which includes the measurement of knowledge, abilities, attitudes, and educational measurement. The field is primarily concerned with the construction and validation of measurement instruments (such as questionnaires and tests). Psychometrics is the field of study concerned with the theory and technique of psychological measurement, which includes the measurement of knowledge, abilities, attitudes, and educational measurement. The field is primarily concerned with construction and validation of measurement instruments (such as questionnaires and tests). A Psychometrician is a credentialed professional (typically an advanced degree) whose primary focus is translating high-level business or program goals into human performance requirements and designing measurement solutions that assess the impact of learning on those requirements.

- The pre- and post-tests are identical (items and sequence); typically pre- and post-tests should not be identical forms unless they are used in an experimental setting, typically with a control group.[21]

It is important to note that developing a valid and reliable criterion-referenced assessment is NOT trivial. Rather, it is a multi-stage process involving professionals skilled in educational assessment design and development.

The first step is to develop an exam blueprint that defines the relevant cognitive domains and associated objectives, and weights these to indicate the number of items each should have on the exam. The following are the next key steps:

- Write the actual test items in conformance with psychometric standards.
- Vet the items with subject matter and psychometric experts.
- Beta test alternative forms of the exam.
- Analyze the results of the beta test to identify "faulty items" (for example, questions that "good performers" get wrong but "poor performers" get right or questions where students consistently select the same wrong answer may be poorly constructed.
- Revise the forms based on the findings from the analysis and analyze the results of subsequent administrations of the exam.

4.3.8 K-12 Program Cost and Sustainability

We also examined the cost per student for three of the four K-12 programs. Table 16 summarizes our findings. The data is based on actual student numbers from 2010 and 2011 and projected numbers for 2012. Based on our review of the cost per student by program, we found the following by program:

- Energenius has the least cost per student and can have a very large reach.
- LivingWise is a little more costly per student but has good reach potential; the cost is largely driven by cost of energy saving kits.

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[21] Although there are proponents of the "identical pre- and post-test" approach, the general consensus among testing experts is that they should be parallel, but not identical — except under specific circumstanced. (If they are identical, taking the pre-test effectively "coaches" for the post-test.) To quote the psychometrician on the Instructional Design review team: *"The two [pre-test and post-test] typically should not have identical items, especially if they are given in close proximity to each other. If the test has been constructed as a criterion-referenced instrument, the items should be drawn from the same domains on each test, but be different examples of each domain. The validity of the two measures would be established by expert review of the items against the domain descriptions, and the reliability of the two measures as equivalent would be established by statistical means."*

There are situations where the pre and post could be the same, **especially in an experimental setting**. For example, a pre-test is often used as a baseline measure, before the instructional treatment. If there is a control group, that may be the only measure they get. After an instructional intervention of some duration (e.g., a school year), a post-test containing the same items could be administered to demonstrate the effectiveness of the intervention."

- PEAK has the highest cost per student, among the programs for which we can estimate this metric, in its current model and has limited reach, since the current model has in-person training and ongoing teacher/classroom support.

Green Schools currently is challenged with applying a cost per student metric. It is very difficult to quantify the indirect reach beyond the directly impacted small group of student teams at each school. This program is using a very different implementation model than the other programs given that it is not a prescriptive program with set curriculum taught in the classroom. The program instead is a project-based program where student teams at each school are formed and those teams have flexibility in the type of energy-related projects they do and how they spread energy education throughout the student body. Because Green Schools allows schools implementation flexibility, it is difficult for the Green Schools program to track the number of students directly and indirectly touched by the program and how those students are affected. It is known that the students on the "green teams" at each school receive the most education, and there is an estimated 3,000 students on the "green teams" in this program cycle. In addition, some teachers may develop lessons they deliver to their classes, or deliver some of the lessons available through the program. Schools also may do some school-wide activities such as posters or assemblies. Students who participate in in-class lessons or are exposed to school-wide activities receive some energy education, but it is not as intensive as the students on the green teams. As such, the broader school-base, up to an estimated 175,000 in this program cycle, might receive some energy-related information but it varies in content and intensity. SCE currently is working with the Green Schools program to review their program theory, intended outcomes, and appropriate program metrics.

Table 16. Cost Per Student Reached by Program (K-12)

Program	Cost	Students Reached	Cost/Student
Energenius (PG&E)	$1.8M	223K	$8
LivingWise (SCE/SCG/Water District)	$1.3M	31K	$42
PEAK (SCE/SCG/PG&E)	$3.8	55K	$70
Green Schools (SCE)	$2.3M	~3K-175K*	Unable to estimate at this time

*Estimate of 3,000 students assigned to "green teams" across participating schools. Estimate 175,000 student reached due to varying types and levels of outreach and educational activities across the schools.

We also found that these programs vary in terms of "sustainability" potential; sustainability in this context refers to how easy it would be for a given school or teacher to continue teaching the program curriculum without direct program support. PEAK, LivingWise, and Green Schools have a goal in SCE territory of reaching 50% new schools annually. Therefore, the ability to grow to new schools and "sustain" existing schools depends on the design of the program and materials. We found that Energenius is the easiest and least expensive when considering the level of school interaction and low level of dependence on special materials and equipment. Table 17 summarizes the sustainability considerations and findings by program.

Table 17. Sustainability by Program (K-12)

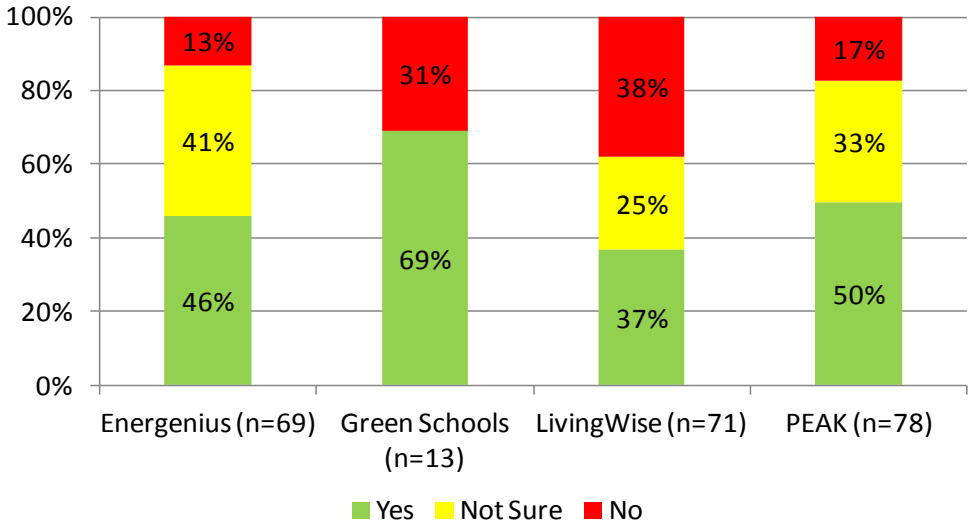
Sustainability Consideration	Energenius	PEAK	LivingWise	Green Schools
Level of school interaction with program staff	None to low	Moderate to low	Moderate to low	High
Type of teacher training provided	Written guidance	One-day in-person workshop plus written guidance	Written guidance (online supplement)	One-day in-person workshop plus in-person follow-up
Teachers' preference for type of training [A]	Online, video-based	In-person	Online, video-based	In-person
Teachers' satisfaction with training they receive [B]	Medium to high (mean 5.6)	High (mean 6.3)	High (mean 6.3)	Low to Medium (mean 3.8)
Dependence on "special" materials and equipment	None to low	Moderate to high	High	High
Mean number of years teaching the program	2.2	2.7	1.9	1.9

[A] Based on teacher self-report of preferred training in the teacher survey.

[B] Based on teacher self-reported satisfaction score in the survey.

The in-class education component of Green Schools appears to be one of the easiest programs to sustain in schools without program support. Because there is no set curriculum, Green Schools helps teachers develop the materials they need to incorporate energy efficiency concepts into the schools on their own. When we asked teachers if they would continue teaching energy efficiency concepts to students in the future without program support, Green Schools teachers were the most likely to continue teaching these topics. Many teachers from the other three programs mentioned it would be difficult for them to continue teaching without the students' materials, workbooks, and kits. However, we note that this is only one aspect of the program that may or may not be used by teachers given the flexible nature of the program. The Student Energy Auditor Training (SEAT) component of the program does require special equipment and guidance and would be difficult to sustain in a school without program support.

Figure 9. Likelihood to Continue Teaching EE Topics without Program Support



4.4 HIGHER EDUCATION

Because DEEP is still in development, our evaluation of the higher education programs focused on the Green Campus program. Below are our key findings for Green Campus. The Appendix provides further detail for both the Green Campus and DEEP programs.

4.4.1 GREEN CAMPUS

Program Goal-Setting

The key change that Green Campus made during the 2010-2012 cycle is the development of more formalized success metrics for its interns. Green Campus has developed four "pillars" of focus for their interns: academic infusion, outreach, energy savings, and green career development. Each campus's team of interns must develop projects that support each of these four pillars. Interns tend to individually focus on one project or pillar, while other interns focus on other projects under the other pillars.

Based on these pillars, the program developed key performance indicators (KPIs) for interns to meet over the course of the year. These KPIs outlined under the four pillars are listed in Table 18.[22]

[22] Source: The Green Campus Program 2010-2012 Statement of Work.

Table 18. Green Campus KPIs by Pillar

Pillar	KPI (2012)
Energy Savings	Average 80,000 kWh savings per campus per year
Outreach	Engage 1,000 students per semester/quarter through outreach and educational activities (note this number can also cross over with academic infusion and green career development activities)
	Develop and implement at least one unique event tailored for students per school semester/quarter
	Distribute nine newsletters promoting energy efficiency topics per year
Academic Infusion	Work with at least 1 faculty member on each campus to devise ways to infuse energy efficiency into the curriculum
	Convene faculty members from each campus to focus specifically on integrating energy efficiency into academic courses
Green Career Development	Host one career event per school semester and a career event at both the mid-year and end-of-year meetings

All 18 interviewed interns said they are aware of and are following the four pillars in their projects, and that they felt that these pillars strongly inform the work that they do. The program is moving in the right direction in the implementation of these four pillars, providing interns with a common framework for their projects, and our interviews found these pillars are strongly guiding the interns' work.

However, some of the KPIs may be inappropriate for some campuses or cause interns to focus on less important areas of the program.

- Only two of the interviewed interns said that green career development was a priority for their team in the 2011-2012 school year. A likely reason for this is that green career goals are much easier to reach than energy savings and general outreach goals: Students are required to hold only one "event" in green careers per quarter or semester, while they must meet precise requirements for energy savings (80,000 kWh/year) and outreach (1,000 students reached). One intern pointed out that these numbers require "more effort to reach," while another said that they are "tethered to the metrics." Therefore, it is easier to give lower priority to the less quantitatively strict requirements of academic infusion and green careers.

- Given that KPIs are flat across all campuses, some campuses have much more difficulty reaching the outreach and savings KPIs than others do, so they must prioritize energy savings and outreach even more. For example, the outreach goals strongly favor large schools compared with small schools. Our review of the populations of the targeted schools found that the largest schools have five to ten times the student population (35,000 to 40,000) of the smallest schools (3,000 to 5,000), meaning that these large schools have a much wider pool of potential students to reach through multiple venues. Energy savings potential also varies from campus to campus: While some campuses are taking on energy savings projects in cooperation with Green Campus, other campuses are implementing LEED or other energy savings actions on their own, limiting the amount of additional savings that Green Campus interns can realistically achieve. Furthermore, some interns reported that

campus staff was disinterested in energy efficiency projects, presenting a barrier that interns on other campuses did not have to face.

Overall Satisfaction

- General feedback on the program is very positive. Interviewed interns reported a high level of satisfaction with the program overall, with a mean score of 5.9 (on a 1-7 scale) from the 18 interviewed interns, and only one intern giving a score below a 5 (and one other rating the program a "4 or 5").

Unique Value

- The program fills an "energy education" gap on many campuses. Most interns said that they were one of several environmental organizations, but only one said that another organization on campus also addressed energy and energy efficiency topics. Campuses with multiple environmental organizations said that they worked to cooperate with these organizations, and that they usually did not duplicate each others' goals or efforts. Campuses with many environmental organizations said that they were regularly in contact with these other organizations and worked collaboratively on some campus events.

- The Green Campus program is also enhancing participating interns' interest and knowledge concerning energy efficiency topics. When asked to rate how much they learned about energy efficiency that they would not have learned otherwise, interviewed Green Campus interns gave a mean rating of a 6.0 (out of 7). These interns praised the real-world experience that the program gave them in learning how to implement energy efficiency projects, as well as hands-on training on conducting audits and the measures that improve energy efficiency.

Program Reach

- Per the Q2 2011 quarterly report, the program reported having 65 total paid interns, with the number varying from four to six for each campus. Across the 13 participating campuses covered in this evaluation, these interns reached roughly 20,000-25,000 students through direct outreach efforts (such as in-person contacts and events) and 145,000 students through indirect outreach efforts (such as marketing efforts and website hits) in the 2010-2011 year.

Program Training and Support

- All interviewed interns said that they received training from the Green Campus program. Sixteen of eighteen agreed that the training they received prepared them for what they experienced as a Green Campus intern. Training topics mentioned most often included the Green Campus program requirements, software skills (especially Excel), outreach and communication strategies, and energy efficiency topics such as measures and saving strategies.

- A variety of types of students were recruited for the program in order for the program to meet the differing program pillars: Some interns focus on the marketing and outreach elements, while others focus on the engineering and technical elements. Meeting the training needs for all of these different types of students can therefore be difficult. For example, some students

wanted more in-depth technical training and development, while others said that they already had technical backgrounds and that the program training was too basic.

- Many interviewed interns mentioned that the annual statewide summit was one of the most valuable training events. The statewide summit is held in late January, and brings student representatives from all participating campuses to one location for a four-day session. Several interviewed interns said that when they first started at the program, they did not feel that they had been fully trained until they attended the statewide summit.

- Campus Leads also play a key support role and help guide Green Campus activities, especially in the long term. Campus Leads are full-time Green Campus representatives who lead and mentor the student intern teams, helping them develop and track their projects and goals. They also serve as the primary liaisons between the Green Campus interns and the central Green Campus program, as well as offer support to Green Campus interns in working with campus stakeholders. Several interviewed interns mentioned that their Campus Leads were key to helping guide them through day-to-day issues. Campus Leads also function as the institutional memory, helping to continue the development of long-term projects and stakeholder relationships as interns graduate from the program.

Green Career Development

The program is strongly promoting green career awareness among its interns, but has room to grow in its reach among the wider campuses.

- Interns develop real-world, marketable skills that apply to a broad base of professions. Interns design projects on energy efficiency topics, develop relationships with stakeholders, manage budgets, and carry out these projects almost entirely on their own. The program builds interns' awareness of energy efficiency and sustainability topics in ways that can apply to their career development. One interviewed intern said that the *"real-world experience about energy efficiency"* gained through Green Campus would give him the *"edge"* in his post-graduate job placement.

- Interns gain these skills through on-the-job training as well as through formal program training. Our interviewed interns said that while they are receiving training from Green Campus, they are primarily learning from and training each other. On-the-job skills that interviewed interns mentioned learning fell into four key areas: technical aspects of energy efficiency, equipment and software, project management, and professional communication skills. Some also learn grant-writing skills if they apply for grants to fund retrofits on campus.

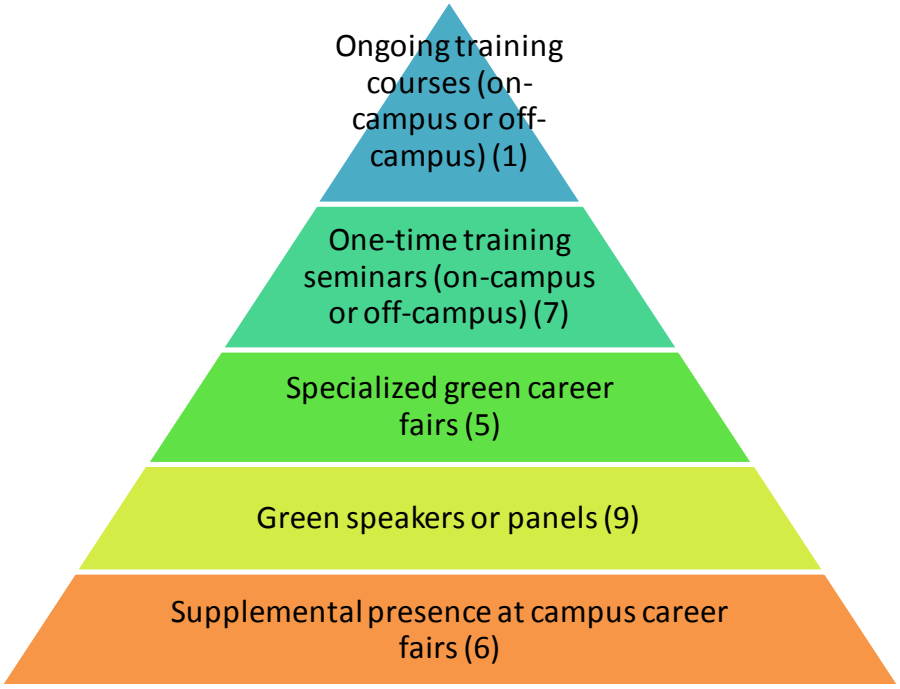
- Furthermore, their participation in Green Campus has influenced many interns to pursue careers in the energy industry or broader sustainability field. Many interns said that the Green Campus program has influenced their plans for their post-college careers and helped train them for the careers they want. Interns gave the program a mean rating of 5.4 (on a 1-7 scale) for influencing their decision to go into their chosen professional field post-college.

- Awareness building of green careers on campus is a new element in the 2010-2012 program cycle, but Green Campus has made significant progress integrating it into their program. All interviewed interns said that they have conducted green career outreach activities on their campuses.

- However, Green Campus students have significant room to engage the wider campus in more depth in green career activities. Interns are required to hold one event per term that falls under the "green career outreach" pillar, but not all green career outreach events

provide the same depth of information. Figure 10 shows the levels of commitment and engagement required (lower levels of commitment on the bottom of the pyramid where most projects happen), and the number of mentions of key Green Campus green career activities.

Figure 10. Levels of WE&T Engagement in Top Green Campus Career Activities (with Number of Mentions in Interviews)

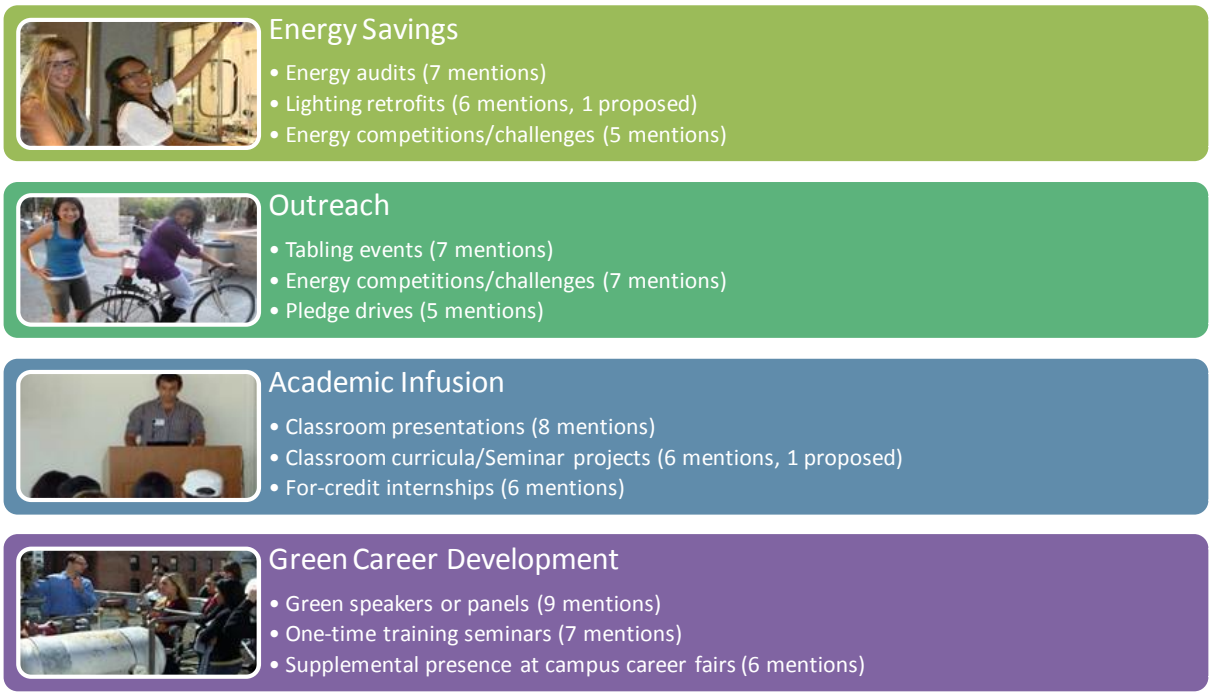


- Most interviewed interns said that their green career development activities included either supplemental "green" presence at campus career fairs, panel speakers, or green career fairs. Other activities mentioned included off-campus visits, training series on energy efficiency topics, and one-time seminars or training sessions on career skills such as audits, resume writing, or grant writing.

Additional Intern Activities

- Intern projects vary enormously by each participating campus. Among the interns we interviewed and campus projects we examined, no two campuses implemented the program in exactly the same way. Because there is so much variation in the types of projects that Green Campus interns carry out, these projects often vary in terms of depth and breadth from campus to campus and project to project. All activities discussed fell into one of the four pillars, although some fell under multiple pillars. Figure 11 shows the most common activities mentioned of each type.

Figure 11. Top Activity Types across Campuses Per Pillar (Multiple Response)



- Although the campuses only have a few paid interns, some campuses are also using volunteers and for-credit internships to increase their direct program reach. Six interviewed interns said that for-credit internships are offered on their campuses. One interviewed intern said that their campus held an event early in the year to draw a pool of volunteers that they could call on for help with events. These volunteers and for-credit interns are delegated tasks from the paid interns, and often play a role in larger Green Campus projects.

- The program is also in touch with campuses at a high level to explore cross-cutting academic infusion strategies. In this activity, the Green Campus program staff (not the program interns) have gathered high-level stakeholders from across the participating campuses both in and outside of California. This activity is still in its very early phases, but as of July 2012 has included a kickoff meeting and follow-up discussions on key topics to address. If this effort is successful, it may lead to significant changes in the implementation of energy efficiency topics at the college level statewide. This will be a key area to follow up on in future evaluation cycles.

The next section details recommendations for improving the Green Campus program.

5. RECOMMENDATIONS

The key findings outlined in the previous section lead to some recommendations for both the WE&T Connections program as a whole and for each sub-program. We note that none of the Connections programs fell under the Workforce, Education, and Training umbrella before the 2010-2012 cycle. The Connections programs have had different priorities, such as safety or energy savings, over their varying times of implementation. Therefore, giving these programs a WE&T focus is still a work in progress. Our program recommendations therefore aim to build on the work that these programs are already undertaking, to bring them more clearly into a process that builds each level of energy efficiency knowledge and career training into the next.

K-12 Program Recommendations

- Connections-wide, the program should set clearer guidelines for what it expects the Connections programs to accomplish. These different programs provide different types, and more importantly different levels, of engagement with energy efficiency topics. Some require only a few hours of classroom time, while others require months or even years of engagement to be fully effective. In terms of content, the goal is to educate students on Integrated Demand Side Management (IDSM) and career options. The programs need to ensure messages are not diluted by trying to do too many things. The program should consider the relative importance of educating students on IDSM and career options so that programs are able to place the appropriate amount of emphasis on each. It may be more difficult for some programs to give equal balance to the two concepts and both concepts may not be appropriate for all grade levels.
    - Focus on top priority goals. Goals for the next cycle of Connections likely will focus on one or more of the following:
        - Energy education (energy efficiency, peak demand, and demand reduction/response)
        - Achieving energy savings (at schools or homes)
        - Laying the foundation for a "green workforce" (develop awareness and appreciation of green careers, providing guidance related to pursuit of green careers)
    - If there are multiple goals for the program, design the approach carefully:
        - Leverage strengths of existing programs
        - Target different efforts to different age groups appropriately
        - Avoid diluting the "message" by trying to cover all of the goals equally; maintain a clear focus for each targeted effort
    - If the goal of the program is **energy efficiency education**:
        - Focus on grades 3-8 to increase "bang for buck." The structure of educational programs will need to be very different depending on the grade level, and 3-8 is where it is easier to integrate into the curriculum.
        - Focus on PEAK and Energenius

- Each offers different content and appeals to different teachers and different grades
- To enhance the experience, link to Green Schools (if this program continues) if schools are interested in more extensive school-wide projects

– To broaden the reach, offer Green Schools since this program will appeal to a different group

- Focus on the projects, not curriculum
- Link projects to PEAK or Energenius curriculum for K-8 to create a more standard educational offering
- Consider focusing Green Schools on 7th grades and higher, while also supporting use of this program more broadly by school districts if they are interested. Note that SCE also is considering targeting only the high school level with Green Schools since the "green team" project-based approach could offer high school students good skills-based training before they enter the workforce while the other programs focus more on providing a basic level of energy knowledge

- If the program goal is to **save energy**:

  – Programs can expand to full range of K-12

  – Offer LivingWise and/or Green Schools since these offer more immediate short-term energy savings (i.e., this program has less emphasis on the educational aspects)

- In addition, if **green careers** continue to be a goal:

  – For younger grades: Continue to explore careers as a ***secondary*** goal (i.e., planting seeds for the future)

  Exposing young children to possible options for green careers is one way that this has been addressed in the younger grade levels, and is appropriate for the younger students (e.g., Brian Only/Career Explorer piece in PEAK is excellent at planting the seed, Biologist …what he does, best part of job, and how he is helping planet.)

  – For middle school and high school: Encourage programs to link to other programs such as Green Pathways or Green Campus, having champions speak at schools to talk about green careers and resources

  – For high school: Develop a targeted effort with the overarching goal of exposure to green careers and resources to take next steps toward a green career. Green Pathways is a good start in this direction.

➢ To increase the effectiveness of Green Schools, we suggest the following:

- Clearly demonstrate how suggested curriculum meets specific California Content Standards and only suggest curriculum that does meet standards.
- Move toward a more prescriptive approach to curriculum so that teachers do not have to create their own lessons. The curriculum should adhere to Content Standards, be targeted to specific grade levels, and cover IDSM and green career concepts.
- Break up training sessions into specific grade levels (K-5, middle, high school) and tailor the training to those grade levels.

- Consider a program design that builds from one grade level to the next starting in the primary years through high school (Energenius' model is the most closely aligned with this) with clear goals of what students should learn at each level. Reaching large numbers of schools and allowing for the infusion of energy efficiency and energy conservation into a multiple year curriculum (rather than just a one-time unit) will ultimately help to meet the state's goals of transforming the market. However, to have a broader reach, multiple designs and flexibility will be needed. To appeal to various teacher audiences, the program should continue to offer both the more intensive offerings (e.g., PEAK) and the supplemental offerings (e.g., Energenius).

- Look at ways to provide more robust support for teachers, possibly through online videos similar to You-Tube style videos

- Link and leverage programs to share resources:
  - Green Schools could encourage high school students to participate in Green Pathways' online course
  - Green Schools could expose students to Energenius' Green Resource Guide or encourage LivingWise participation among Middle Schools
  - Green Campus interns could visit Green Schools at the high school level
  - Green Pathways could encourage the Centers to participate as "green gurus" and potentially set up non-paid internships

- Consider development and implementation of appropriate summative evaluation instruments to provide meaningful information about whether the program(s) is achieving goals in terms of students' performance

Green Campus

- Green Campus has the potential to be a linchpin program in building the "Connection" between K-12 education and career training in energy efficiency (along with DEEP and Green Pathways, which are still in the development phase). The program has been very effective in developing a core group of students with a strong interest in sustainability careers through its program internships. Going forward into 2013 and beyond, the program should continue this focus while also considering ways to expand opportunities for green career development on its wider participating campuses.
  - Of the four pillars, green career development should be prioritized over energy savings projects. Outreach is valuable for promoting EE awareness and behavior change, but savings as a KPI is not inherently important for this program. WE&T is more important than resource acquisition – developing savings projects are a valuable means of advanced training for Green Campus interns, but should not be the driving metric of the success of campus projects.

- Consider individual campus needs in setting KPIs. Set relative KPIs (e.g., outreach to 10% of student population/year, 10% energy savings). Setting absolute goals statewide puts smaller schools and newer programs at a sometimes severe disadvantage compared to larger schools with long-standing programs. The current KPIs treat all participating schools as though they have the same barriers, populations, and potential for savings – however, our evaluation has shown emphatically that this is not the case. These absolute numbers also force students to focus on KPIs that are not as important to making the program effective under WE&T.

- Program staff should continue to focus on the high-level strategy for promoting academic infusion. Green Campus interns should focus on academic support.

- Consider moving some training elements of the student summit to the beginning of the school year rather than after winter break. Students consider the summit very valuable for training and networking, and the summit allows students to brainstorm in collaboration with their peers at other campuses. It also provides a very valuable orientation and training opportunity for the newest interns. Due to campus stakeholder availability, this may require splitting the two meetings (the student meeting and the stakeholder meeting) into separate events.

- Increase networking opportunities across campuses, especially for campuses that are struggling to meet their goals. Campuses with similar issues and barriers (such as campuses with high levels of commuters, small campuses, and LEED campuses) should get special opportunities to network and discuss effective strategies.

- Consider supporting or implementing for-credit internships on all participating campuses. This is way to expand reach and bring more students into the in-depth career training of Green Campus without providing additional paid internships.

Future Evaluation Efforts

- We note that evaluating Green Campus and Green Schools with traditional methods is challenging due to the varying implementation activities at each school. In future evaluations of these programs, we highly recommend that evaluation efforts include case studies of at least three participating schools. Given the research objectives and budgetary constraints of this study, we were unable to execute this approach. However, we know that schools differ greatly in their strategies and needs for program implementation. A case study approach would allow future evaluators a more comprehensive portrait of these programs, allowing them to better delve into the unique impacts of the program on each school.

Appendix A: Detailed Program Findings

Energenius

Teacher Survey Data Frequencies

Survey Fielded: Feb. 10-Feb. 17, 2012

Respondent n: 69 for all questions unless otherwise noted[23]

QI1

What grade level(s) do you teach?

Choices	
Kindergarten	28%
1st grade	12%
2nd grade	12%
3rd grade	16%
4th grade	16%
5th grade	20%
6th grade	14%
7th grade	10%
8th grade	6%
(Other)	4%

QI2

How many years have you been teaching?

Choices	
0-2	4%
3-5	9%
6-10	29%
11-15	23%
16-20	13%
21-25	6%
26+	16%

[23] Note that our questions pertained to the 2010-2011 materials. As of the 2011-2012 school year, several of the Energenius curricular materials have been updated. The following materials have been removed, including the Bill Buster and the Habits programs. We also note that a large proportion of survey respondents teach kindergarten and/or first grade and use the Big Book, which has been updated since the 2010-2011 year.

QI3

What subject or subjects do you teach?

N: 18

Choices	
Mathematics	50%
General sciences	44%
English or language arts	44%
Natural or physical sciences	33%
Environmental sciences	28%
Multiple subjects/all subjects	28%
History or social studies	22%
(Other)	11%

QI4A

To what grade level(s) do you teach the Energenius program materials?

N: 13

Choices	
Kindergarten	23%
1st grade	38%
2nd grade	8%
3rd grade	8%
4th grade	15%
5th grade	15%
6th grade	31%
7th grade	31%
8th grade	23%
<Open end response to QI1>	8%

QI4B

During which subject or subjects do you teach the Energenius program?

N: 10

Choices	
General sciences	60%
Natural or physical sciences	20%
Environmental sciences	10%
Mathematics	10%
<Open end response to QI3>	30%

QI5B

How many years have you been teaching materials from the Energenius program?

N: 68

Choices	
0-2	72%
3-5	21%
6-10	6%
11+	1%

QI6

Approximately how many students do you teach the Energenius program materials to per year?

Choices	
1-25	51%
26-50	38%
51-75	6%
76-100	3%
101-125	1%
126-150	1%

QI7

How did you FIRST hear about the Energenius program?

Choices	
By mail or email	49%
Educator conference or workshop	25%
Recommendation by a colleague	16%
Online	10%

QSA1

How satisfied are you with the Energenius program overall?

Choices	
1 - Not at all satisfied	0%
2	0%
3	1%
4	6%
5	19%
6	39%
7 - Very satisfied	35%
Mean	**6.00**

QSA2

How likely are you to recommend the Energenius program to a colleague?

Choices	
1 - Not at all likely	0%
2	1%
3	0%
4	7%
5	14%
6	30%
7 - Very likely	46%
Mean	**6.12**

QSA4

Do any other teachers at your school use the Energenius materials?

Choices	
Yes	29%
No	19%
(I don't know)	52%

QSA4A

Why not?

N: 13

Choices	
I am the only teacher at my school who teaches a subject related to Energenius.	46%
I am the only teacher at my school who teaches at Energenius' grade level.	31%
They have not attended training	8%
Topics have been integrated into the wider school/district curriculum	8%
(Other)	15%

QET1

Have you designed any lesson plans or classroom activities to teach students about energy efficiency or energy conservation outside of the Energenius program?

Choices	
Yes	58%
No	36%
(I don't know/I don't remember)	6%

QET2

Has your school conducted any schoolwide efforts to educate students on energy efficiency or energy conservation outside of the Energenius program?

Choices	
Yes	32%
No	52%
(I don't know/I don't remember)	16%

QET3

How, if at all, did your outside efforts differ from the Energenius program, either in topics or methods?

N: 49

Choices	
There were no differences between these efforts and the Energenius program	51%
Sustainable/renewable energy program	12%
Other programs that promote general conservation	12%
School/district developed program	8%
Waste reduction/compost/recycling program	6%
Program less effective than PEAK materials	2%

(Other)	12%

QET4

Have you participated in any education programs other than Energenius that teach students about energy efficiency or energy conservation topics?

Choices	
Yes	26%
No	74%

QET5

What program(s) did you participate in? Please select all that apply.
N: 18

Choices	
California Education and the Environment Initiative (EEI)	22%
WaterWise or Energy Wise	17%
Green Schools	6%
PEAK	6%
(Other)	50%
(I don't know/I don't remember)	11%

QET6E

Are you still participating in any of the following programs?
N: 2

Choices	
Green Schools	50%
PEAK	50%
(Other)	0%
(I don't know/I don't remember)	0%
(I'm not longer participating in any of them)	0%

QT1

Did you read through the teacher instructions that came with the Energenius materials?

Choices	
Yes	94%
No	6%

QT2A

How would you rate the instructions on preparing you for teaching the lessons in the classroom?
N: 65

Choices	
1 - Not at all satisfied	0%
2	0%
3	0%
4	8%
5	20%
6	46%
7 - Very satisfied	26%

Mean	**5.91**

QIC1

Approximately how many hours did you spend teaching Energenius program materials during the school year?

Choices	
1-10	75%
11-20	16%
21-30	3%
31-40	1%
41-50	0%
51+	4%

QIC1A

Were those hours spread out over ...

Choices	
One week	25%
One month	33%
One quarter	16%
One semester	13%
The entire school year	13%

QIC2E

Which Energenius program materials have you taught or do you plan to teach?

Choices	
Energy and Me	48%
Trees, Energy, and the Environment	42%
Light Right	35%
Energenius Big Book	33%
Energy Check-Up for the Environment	28%
Habits	28%
Energenius E Program	22%
Bill Buster	9%
(All of them)	12%
(Other)	3%
(I don't know/I don't remember)	3%

QIC3

Are there any Energenius program materials that you do not plan to teach, or that you have taught in the past and will not teach again?

Choices	
Yes	13%
No	87%

QIC4E

Which Energenius program materials do you no longer plan to teach?

N: 9

Choices	
Bill Buster	44%
Energenius Big Book	22%
Energenius E Program	22%
Energy and Me	11%
What is not grade-level appropriate	22%

QIC4A

Why do you no longer plan to teach these programs?

N: 9

Choices	
My students did not understand them.	56%
I don't have time to teach them.	22%
My students were not interested in them.	11%
They do not fit the curricular requirements for my students' grade level.	11%
(Other)	11%

QIC5

Are there any topics that the Energenius materials do not cover that you would like them to cover?

Choices	
Yes	7%
No	93%

QIC6

What topics?

N: 5

Choices	
(Other)	100%

QIC7

When you taught the Energenius materials, did you make any changes or additions to the lesson plan?

Choices	
Yes	39%
No	61%

QIC7A

What changes did you make?

N: 27

Choices	
Shortened/simplified/condensed	41%
Additional labs/hands on exercises	22%
Modified/personalized lessons (general)	19%
PowerPoint/presentations	15%

Coordinated with textbook/required curriculum	15%
Translated into another language	4%
Coordinated with other environmental activities on campus	4%

QIC7B

Why did you make these changes?

N: 27

Choices	
Easier for students to understand	30%
More in-depth learning	26%
More interactive learning	22%
Time constraints	15%
Meeting standards	11%
(Other)	4%

QCS5

Have you ever contacted PG&E related to the Energenius program for reasons other than ordering materials?

Choices	
Yes	7%
No	93%

QCS5A

What did you contact them about?

N: 5

Choices	
Missing materials	20%
(Other)	80%

QCS6

Would you find it useful to have scheduled, personal contact with PG&E Energenius program staff?

Choices	
Yes	17%
No	30%
Not sure	52%

QCS4

How often would you prefer to interact with Energenius program staff?

N: 48

Choices	
More than once a week	0%
Once a week to once a month	0%
Once a month to once a semester	8%
Once a semester to once a year	63%
Less than once a year	25%
Never	4%

QSE1

How effective are the Energenius materials in educating your students about energy efficiency?

Choices	
1 - Not at all effective	0%
2	0%
3	0%
4	3%
5	16%
6	41%
7 - Very effective	41%
Mean	**6.19**

QSE3

What elements of the Energenius program and materials did they enjoy most?

Choices	
Coloring book/drawing/worksheets	28%
Big book	17%
Everything/program material in general	14%
Calendar	12%
Poster/stickers/visuals	12%
Finding ways to save at home	10%
Hands on activities/labs/experiments/materials (general)	9%
Video/multi media activities	6%
Like how easy it was to use and understand	6%
Tree/environmental sections	4%
Energy conservation	4%
Games	3%
(Other)	6%
(Don't know/don't remember)	1%

QSE4

What elements of the Energenius program and materials did they enjoy least?

Choices	
The reading	12%
When there's too much written work	7%
When there's too much information/too dense	6%
Coloring/big book/visuals	6%
Language difficulties	3%
Above students' grade level/too difficult for students	3%
(Nothing/enjoyed everything)	43%
(Other)	9%
(Not sure/can't remember)	14%

QSE2A

How much do you agree with the following statements:

My students were able to understand the Energenius materials.

Choices	
1 - Strongly disagree	3%
2	1%
3	3%
4	3%
5	16%
6	35%
7 - Strongly agree	39%
Mean	**5.88**

QSE2B

How much do you agree with the following statements:

My students were able to complete the student workbook activities.

Choices	
1 - Strongly disagree	3%
2	0%
3	7%
4	10%
5	19%
6	26%
7 - Strongly agree	35%
Mean	**5.59**

QSE2C

How much do you agree with the following statements:

My students learned about ways to save energy from the Energenius materials that they would not have learned otherwise.

Choices	
1 - Strongly disagree	0%
2	1%
3	3%
4	7%
5	14%
6	32%
7 - Strongly agree	42%
Mean	**5.99**

QSE2D

How much do you agree with the following statements:

The Energenius program materials were appropriate for my students' grade level.

Choices	
1 - Strongly disagree	1%
2	1%
3	1%

4	13%
5	9%
6	35%
7 - Strongly agree	39%
Mean	**5.87**

QSE2E

How much do you agree with the following statements:
The Energenius materials correlate to the California Content Standards.

Choices	
1 - Strongly disagree	3%
2	1%
3	1%
4	10%
5	20%
6	26%
7 - Strongly agree	38%
Mean	**5.72**

QSE2F

How much do you agree with the following statements:
The Energenius materials were easy to integrate into my instructional programming.

Choices	
1 - Strongly disagree	3%
2	0%
3	0%
4	13%
5	25%
6	26%
7 - Strongly agree	33%
Mean	**5.68**

QEK1

Have you and your students ever discussed actions that they could take to save energy at home?

Choices	
Yes	99%
No	1%

QEK2

What are the key actions that the Energenius program promotes for students to take at home, if any?
N: 68

Choices	
Turning off lights	24%
Turn off appliances/electronics when not in use	21%
Actions to take to be more efficient (general)	21%
General awareness of consumption	19%
Water conservation	12%

Talking to family members	6%
Phantom loads/energy vampires	4%
Safety and energy efficiency	4%
Install CFLs	3%
Energy efficient appliances	1%
Home energy assessments	1%
(Nothing specifically)	31%
(Other)	3%

QEK2A

How interested were your students in the Energenius take-home posters?

N: 68

Choices	
1 - Strongly interested	1%
2	6%
3	3%
4	10%
5	25%
6	25%
7 - Extremely interested	29%
Mean	**5.44**

QEK3

Why not?

N: 1

Choices	
Not relevant to curriculum	100%

QEK4

Have you received feedback from parents/guardians on the Energenius take-home posters or student materials?

N: 68

Choices	
Yes	22%
No	78%

QEK5

Was the feedback you received from parents positive, negative or mixed?

N: 15

Choices	
Positive	87%
Negative	0%
Mixed	13%

QC1E

Have you conducted any lessons about green careers in your classroom?

Choices	
Yes	30%
No	70%

QC2A

How much do you agree with the following statements:

My students would find information about green careers interesting.

Choices	
1 - Strongly disagree	3%
2	9%
3	10%
4	14%
5	23%
6	20%
7 - Strongly agree	20%
Mean	**4.88**

QC2B

How much do you agree with the following statements:

Information about green careers would be appropriate for my students' grade level.

Choices	
1 - Strongly disagree	4%
2	10%
3	13%
4	16%
5	17%
6	17%
7 - Strongly agree	22%
Mean	**4.71**

QPR1

In what ways, if any, could the Energenius program be improved overall that you haven't already described?

Choices	
More activities (including online activities)	7%
More accessible program (i.e. ESL, Special needs, etc)	4%
Additional materials for kits	3%
Preschool version	3%
Improve quality of materials	1%
(None/No additional ways)	80%
(Other)	3%

QPR2

If you no longer received the free educational Energenius program materials, do you think that you would continue to teach any of the SAME TOPICS that you are currently teaching through the program?

Choices	
Yes	46%
No	13%

Not sure	41%

QPR3

What topics would you continue to teach?

N: 32

Choices	
Energy saving actions	91%
Alternative/Renewable resources	75%
Electricity	66%
Background on energy resources	56%
Natural gas	56%
(Other)	9%

QPR5

What would you need in order to continue teaching these topics in the future without Energenius program resources?

Choices	
Lessons/books/online teacher resources	38%
Worksheets/workbooks/coloring books	19%
Hands-on materials/lab supplies	16%
Time	7%
Guidance/staff support	6%
Funding	3%
Assemblies	1%
(I don't need anything to teach these topics)	17%
(Other)	7%
(Don't know)	6%
(Refused)	3%

QPD2

What type of training would you prefer to help you best teach energy efficiency concepts to your students?

Choices	
An online video-based training where you may learn from the trainer in a video at your own time and watch some examples of students or teachers doing the activities or receiving the lessons	54%
An in-person training where you learn from a live teacher and have the opportunity to practice some of the lessons and activities that would be asked of your students	26%
Written training documents for you to read on your own time	19%
(None)	1%

QPD3

Which of the following would be the most effective way to teach energy efficiency topics in your classroom?

Choices	
Infusion of energy efficiency lessons into the main curriculum for the year	45%

Supplemental materials that are taught separately and used as needed	55%

QPD4

And which of those methods do you think you CAN teach at your school?

Choices	
Supplemental materials that are taught separately and used only as needed	32%
Infusion of energy efficiency lessons into the main curriculum for the year	10%
I would be able to use either of these methods.	58%

QPD5

Which of the following would be the most effective way to design energy efficiency lesson plans for your classroom?

Choices	
I choose one or more pre-designed lesson plans from among a list of specific energy efficiency topics.	58%
I design my own lesson plans on energy efficiency, with some guidance as needed.	22%
I receive one pre-designed lesson plan on energy efficiency that I can follow.	20%

QPD6

Which of the following activities would be MOST useful in teaching energy efficiency topics to your students?

Choices	
Lab activities	42%
Take-home energy kits (including items for students to install in their homes)	25%
Take-home posters including tips for ways to save energy	17%
School-wide assemblies or speakers	13%
School energy efficiency audits conducted by students	3%

PROGRAM SNAPSHOT

Energenius

PG&E

Budget: $1.8 million ($8/student)

20 years

Target audience: Grade K-8, PG&E terr.

Low-income emphasis: Incorporating Title 1 schools into target population (50%)

Overview of Goals

•**Knowledge** of environmental impacts of their own energy use and production of energy.
•**Actions in the school and home** to conserve natural resources and protect the environment.
•**Career awareness and exploration** that focuses energy related jobs and careers, including web-based green careers module.
• **'Go Green' resources** to support greening campuses.
•**Energy Patrols** to monitor energy waste and efficiency actions.

Description of Curriculum

•Tied to **CA CDE Content Standards.**
•Choose one or multiple among **grade-targeted, single-topic units.**
•Topics include **energy efficiency**, including uses and sources of energy, energy efficiency, conservation, protection of the environment, personal actions and safety.
•**Enhanced curriculum to meet California's Strategic Plan,** e.g. career awareness and exploration, as well as new modules re: trees, water, renewable energy, and transportation.

Description of Other Activities

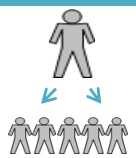
•**Green Career Resources** Guide
•Exhibits at **Educational Conferences**
•Direct Mail Marketing
•Advertisements to reach educators

Reach of Program (2010-present)

Number of Schools	2,332
Number of Teachers	?
Number of Participating Students	223,000

Description of Key Target

K-8 teachers within PG&E service area



ALIGNMENT WITH STRATEGIC PLAN: Summary of Changes Made

• Created **4 new program components** for the 2011-2012 school year:
1. Transportation, Energy, and the Environment
2. Water, Energy, and the Environment
3. Green Career Supplements for Transportation and Energy Check-up
4. Marketing Poster/Mailer

•In addition, the **Energy Safety** components are **being phased out**.
•**Smart Energy Technologies** is in the planning stage for 2012-2013 to help students understand how energy is measured and used.
•Considering **reaching out to other groups**, like Boys and Girls Club, as well as creating **modules for preschoolers** around habits.

Methods of Program Delivery

•Teachers **order lesson plans** with teacher and student workbooks and information on energy efficiency.
•Materials are then **mailed to teachers**
•Students receive activity books, calendars, stickers, energy calculators, and classroom posters.

Description of Level of Engagement

•Students use science, mathematical, language and social science skills to learn the fundamentals of energy efficiency.
•Our evaluation found teachers spent about **2.3 hours per lesson** and **12 hours total** engaging students in the lessons.

Description of WE&T/Career Emphasis

•Younger students can explore green jobs through **booklets** that focus on green jobs and careers (not yet distributed).
•Program expanding reach to grades 9-12 with **Career Resource Guide** in 2012 (still in development as of evaluation)

Description of WE&T/Low Income / Disadvantaged / Minority Emphasis

•Identify **Title 1 schools** where 40 percent of students qualify for free /reduced lunch program.
•Setting a goal of **50% of participating students** should come from schools identified as targeted population.

DETAILED YARDSTICK FINDINGS

Table 19. Energenius Learning Effectiveness Yardstick Results

LEARNING EFFECTIVENESS	ENERGENIUS
Objectives	**100%**
There are learning objectives (clearly stated student goals and outcomes)	100%
The learning objectives are specific, observable, and measurable	100%
The objective hierarchy is clearly delineated (TPOs and EOs)	100%
Objectives correspond with the Content Standards for California Public Schools and the California Environmental Principles and Concepts	100%
Lesson design	**92%**
Lessons' content directly supports the learning objectives	92%
Lessons directly support activities	92%
Lessons, collectively, employ a variety of media/modes (visual, aural, and kinesthetic)	100%
Lessons include estimated time frames for completion	83%
Activity design	**95%**
Directly support the learning objectives	88%
Directly support the lessons	92%
Use a variety of effective approaches to involving students	100%
Directly involve students in hands-on, learning-by-doing activities	88%
Enable the students to discover important information on their own.	88%
Enable the learners to contribute ideas	88%
Engage learners in problem solving	78%
Program materials	**96%**
Materials reflect a logical and coherent structure that facilitates efficient and effective teaching and learning	100%
Materials include cues to delineate the logical organization of the materials	100%
Materials' organizational cues facilitate readily identifying and locating functional areas (major topics, lessons, preparation guidelines, etc.)	100%
Materials have titles, headings, and subheadings (e.g., for chapters and sections)	100%
Materials have introductory paragraphs	100%
Materials use complete paragraphs, including a clear topic sentence, relevant support, and transitional words and expressions (e.g., “similarly,” “in contrast,” “As a result of…”)	100%
Materials employ visual cues to engage and support the reader	100%
Materials employ typographical aids (boldface, italics, bullets, spacing)	100%
Materials employ relevant visual aids (illustrations, photographs, charts, graphs, maps, etc.)	100%
Materials employ manageable, not overwhelming, visual stimuli	100%
Materials employ visual cues (highlighting, sidebars, icons, etc.) to indicate important terms and content	100%

LEARNING EFFECTIVENESS	ENERGENIUS
Materials use a consistent method of orienting reader to the focus or intent of each section (focus questions, objectives, topic list, etc.)	89%
Materials use a consistent method of concluding each section	79%
Unit includes follow-up questions	98%
Unit includes comprehension questions	95%
Unit includes application questions	100%
Assessments	**33%**
Units, collectively, provide strategies and tools for continually measuring student achievement	100%
Units, collectively, include formative evaluation strategies and instruments	0%
Answer keys, suggested responses, or evaluation guidelines are provided for formative evaluations	na
Units, collectively, include summative evaluation strategies and instruments	0%
Answer keys, suggested responses, or evaluation guidelines are provided for summative evaluations	na
Summative instruments include items that sample the full range of learning objectives, including terminal performance and enabling objectives	na
Summative instruments distinguish between those who can meet the learning objectives and those who do not	na

Table 20. Energenius Support Yardstick Results

SCHOOL/TEACHER SUPPORT	ENERGENIUS
Implementation support	**99%**
Materials provide clear context for the program elements and materials (roadmap, overview of elements and relationship among them)	100%
Materials include a summary of units	100%
Overall for Unit Intro	100%
Unit includes an introduction, overview, or advanced organizer.	100%
Unit introduction, overview, or advanced organizer describes overall focus of unit	100%
Unit introduction, overview, or advanced organizer describes overall goal(s) or objective(s) — or both — of unit	100%
Unit introduction, overview, or advanced organizer previews / overviews lessons included in unit	100%
Includes clear statement of which Content Standards are supported by lessons in the unit	100%
Unit provides logistical and delivery guidance	93%
Unit includes timing guidelines for lessons	83%
Unit includes recommendations or ideas for delivering lessons	100%
Unit includes recommendations or ideas for reinforcing lessons	96%
Overall for Unit enhancing/expanding related learning	100%
Unit includes suggestions for enhancing and expanding related learning	100%
Include suggestions and guidance for group discussions (topics, questions, etc.)	100%
Include suggestions and guidance for follow-on activities	100%
Include references to supporting resources to expand knowledge (articles, web sites, etc.)	100%

SCHOOL/TEACHER SUPPORT	ENERGENIUS
Implementation flexibility	**100%**
Materials are modular	100%
Materials provide suggestions / guidance for adapting or tailoring delivery	100%
Design includes methods for extending learning beyond the classroom (to the rest of the school, to the home, to the community)	100%
Design/approach calls for manageable teacher prep time commitment	100%
Design/approach leverages students (teaching others, leading activities, etc.)	100%
Implementation sustainability	**77%**
Percentage of lessons that require NEITHER special materials nor equipment that must be purchased if used AFTER program participation has ended	78%
Aspects of the program are available to teachers AFTER program participation has ended	97%
Lessons and activities available to teachers AFTER program participation	100%
Special materials available to teachers AFTER program participation	97%
Special equipment available to teachers AFTER program participation	90%
Assemblies or speakers available to teachers AFTER program participation	na
Events (field trip opportunities, contests, fairs, etc.) available to teachers AFTER program participation	100%
Other aspects available to teachers AFTER program participation	100%
Aspects of the program are available to students (or parents or both) AFTER program participation has ended	100%
Self-guided lessons or activities available to students AFTER program participation	100%
Special materials available to students AFTER program participation	100%
Special equipment available to students AFTER program participation	100%
Events (field trip opportunities, contests, fairs, etc.) available to students AFTER program participation	100%
Other aspects available to students AFTER program participation	100%
A variety of methods are used to provide access to relevant aspects of the program AFTER program participation has ended.	33%
Key resources are available online on website (primary program materials)	0%
Key resources are downloadable from website (primary program materials)	0%
Key resources delivered (via mail, etc.) upon request (primary program materials)	100%
Alignment with relevant Content Standards for California Public Schools	**100%**
Lessons and activities are targeted to specific grade levels	100%
Lessons and activities map directly to “Strands” or “Disciplines” defined in Standards	100%
There is a clear, logical linkage between lessons and activities to Standards goals (specified for each strand/discipline)	100%
Materials conform to EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria for Science	98%
Are scientifically accurate	100%
Refer to CA Science Content Standards (no reference to national standards or benchmarks or any standards other than CA Content Standards)	100%

SCHOOL/TEACHER SUPPORT	ENERGENIUS
Include examples directly supportive of the Standards that give direct attention to the responsibilities of all people to create and maintain a healthy environment and use resources wisely	100%
Support the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards	100%
Provide explicit instruction in science vocabulary that emphasizes the usage and meaning of common words in a scientific context	100%
Employ proper grammar and spelling	89%

Table 21.Energenius Learning Focus Yardstick Results

LEARNING FOCUS	ENERGENIUS
Development of energy efficiency concepts	**100%**
Units addressing energy efficiency concepts	**100%**
Includes elements (topics, lessons, activities) that address energy efficiency	100%
Positions the importance and benefits of saving energy	100%
Addresses measures and actions that can reduce energy consumption	100%
Includes examples of impact and benefits of energy efficiency measures and actions	100%
Compares and contrasts wasteful and energy efficient alternatives	100%
Includes specific calls to action to increase energy efficiency	100%
Development of concepts specific to renewable energy sources	**70%**
Units addressing concepts specific to renewable energy sources	56%
Includes elements (topics, lessons, activities) that address renewable energy	56%
Positions the importance and benefits of renewable energy	60%
Includes examples of renewable energy	80%
Includes examples of how renewable energy is generated	80%
Includes specific calls to action re. renewables	60%
Development of concepts specific to demand response and demand reduction	**na**
Units addressing concepts specific to demand response and demand reduction	**0%**
Includes the concept of energy demand (vs. consumption)	0%
Includes elements (topics, lessons, activities) that address demand reduction	na
Includes elements (topics, lessons, activities) that address demand response	na
Positions the importance and benefits of reducing demand (general demand reduction or demand response or both)	na
Includes examples of impact and benefits of demand response	na
Includes examples of impact and benefits of sustained demand reduction	na
Includes examples of impact and benefits of permanent load shift	na
Includes specific calls to action to lowering demand	na
Development of awareness, knowledge, and appreciation of green careers *	**75%**
Unit includes elements (topics, lessons, activities) that address green careers	30%

LEARNING FOCUS	ENERGENIUS
Describes the personal benefits associated with green careers	67%
Describes the benefits to environment/society associated with green careers	100%
Presents role models in green careers	0%
Includes pointers to approaches or next steps to developing a green career	100%
Linkages to appropriate subject/content areas per unit	**4**
Average number of linkages per unit to content areas in addition to Math and Sciences	3
Math	1
Science	1
Sociology	1
Biology	0
Language Arts	1
Other	2

* These scores probably are artificially low. The unit that focuses specifically on Green Careers was under development at the time of our review, and much of the content was still to be developed.

NARRATIVE DETAILS FROM ID REVIEW

Overall Findings

Table 22. Energenius Material Review Snapshot

Snapshot of Materials	
Grades addressed	K–12*
Approx total hours of instruction	50 ("mainstream" lessons and activities only)
Number of units ("books")**	10
Number of lessons	32

* Of the materials provided for review, only the "Green Careers" unit addressed grades 9 – 12. That unit was in development at the time of review.

**Including "Energy Patrol," which is different in treatment than other units.

Overarching

The units of instruction target different age groups in K–12 and are realistic in approach to abilities of students at the various levels. Performance-based objectives appear well targeted and well supported by the design. Units are mostly topical in focus, with the primary focus being energy efficiency and with different themes for different grade levels. A strong "hands-on" element helps ensure students actively engage in the learning experience in a meaningful way.

Implementation Feedback (from teacher interviews)

Units Taught:

- Most teachers taught 3 out of 8 possible units
- Most popular units are:

  Energy and Me (Grades 2-3) (48%); Trees, Energy, and the Environment (4-6) (42%); Light Right* (6-8) (35%); Energenius Big Book (K-1) (33%)
- All teachers are continuing to teach at least one Energenius unit

Support of Teachers and Students

The lesson design and materials design support effective, flexible learning experiences.

- Lesson plans are generally complete, consistent, and well described.
- Learning objectives are clear and appropriate and support the relevant standards.
  - All units have a clear statement of learning objectives that describe what students will do as a result of the lessons.
  - Objectives are mapped to the Content Standards for California Public Schools and are consistent with the California EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria.

- A "spot check" of lessons confirms that the mapping of objectives to Content Standards is accurate.

➢ Lessons and associated activities:

- Support the learning objectives and are appropriate to the targeted grade level
- Employ a variety of modes (to engage and support students with different styles)
- Can be readily adapted to specific needs and situations using suggestions for tailoring activities and "extended learning" opportunities
- Often "leverage" students (rather than being completely teacher-dependent) by having students teach others, lead activities, etc.

➢ Numerous "learning by doing" and "problem solving" activities — combined with follow-up questions for both comprehension and application — help ensure students "get" the concepts and encourage thinking and applying rather than simple rote responses.

➢ Materials are complete and are well presented, and seem appropriate to the target age groups.

Sustainability

The design is relatively "sustainable."

➢ Most lessons can be taught without special guidance other than is included in the teacher's guide.

➢ The design generally does not require special materials or equipment for lessons or activities — other than the print materials (student workbooks and teacher's guides).

- Teacher materials may be reused.
- Student materials need to be replenished for each group of students.

  There are a few minor exceptions to rule that lessons do not require special materials or equipment. For example, the E Program unit calls for short pieces of insulated wire, which are the teacher's responsibility. (Such wire would be cheaply and easily available at a hardware store.)

Energy-related Content (incl. "Green Careers")

In general, units strongly support energy efficiency concepts, with lesser support of other energy-related topics.

The following is specific to the "main stream" lessons, and **does not take into account the auxiliary learning opportunities**. For example, the E Program unit covers demand reduction in "Extension of the lesson."

➢ **Energy Efficiency** — All units (100%) address energy efficiency though lightly in the early grades

➢ **Renewables** — About half (56%) of the units address content and concepts specific to renewable energy sources.

- **Demand** — None (0%) of the units address content and concepts specific to demand response or demand reduction.
- **Green Careers** — About a third (30%) of the units address awareness, knowledge, and appreciation (and pursuit) of green careers, though it appears that this is an area that is targeted for future development efforts.
  - The three units that address "green careers" are newer units (two of them were still under development at the time of this review).
  - One is focused entirely on "green careers," the other two integrate the information into units focused on other topics (Transportation, Energy, and the Environment, and Water, Energy, and the Environment).

Support of Standards

There are linkages to a variety of appropriate subject/content areas specified in the Content Standards.

Table 23. Energenius Units and Subject Areas

Subject Area	Percentage of Units Addressing
Math	67%
Science	100%
Sociology	56%
Biology	0%
Language Arts	100%
CA Environmental Principles	70%
Visual and Performing Arts	57%

Assessments

The teacher's materials provide good guidance for informal formative evaluation of students' achievement, but there are no formal formative evaluation instruments included in the materials.

There also are no summative evaluation instruments (e.g., post-test).

Miscellaneous

- Website has lots ordering information for all programs, and seems not to have any restrictions on how many or how often orders can be submitted.

  Website includes fairly-easy-to-find links to many resources beyond the program content.
- Advanced workshops and a summer institute for teachers and (high school) student internships are offered through California Academy of Sciences.

PEAK STUDENT ENERGY ACTIONS

TEACHER SURVEY DATA FREQUENCIES

Survey Fielded: Jan. 31-Feb. 1, 2012

Total Program Participants (2010-2011 databases): 466 teachers

Respondent n: 78 for all questions unless otherwise noted

QI1

What grade level(s) do you teach?

Choices	
Kindergarten	0%
1st grade	4%
2nd grade	5%
3rd grade	14%
4th grade	60%
5th grade	45%
6th grade	17%
7th grade	6%
8th grade	5%
9th grade	0%
10th grade	0%
11th grade	0%
12th grade	0%

QI2

How many years have you been teaching?

Choices	
Less than 1 year	1%
1-5 years	12%
6-10 years	27%
11-15 years	31%
16-20 years	21%
More than 20 years	9%

QI3

What subject or subjects do you teach?

N: 17

Choices	
General sciences	41%
Mathematics	41%
Natural or physical science	29%
English or language arts	24%
Environmental sciences	18%
Biology	12%
History or social studies	12%

Multiple subjects/all subjects	12%
Chemistry	6%
Computer science	6%
(Other)	6%

QI4A

To what grade level(s) do you teach the PEAK program?

N: 22

Choices	
Kindergarten	0%
1st grade	5%
2nd grade	0%
3rd grade	23%
4th grade	64%
5th grade	45%
6th grade	32%
7th grade	9%
8th grade	14%
9th grade	0%
10th grade	0%
11th grade	0%
12th grade	0%

QI4B

During which subject or subjects do you teach the PEAK program?

N: 11

Choices	
Other natural or physical science	45%
Environmental sciences	27%
General sciences	18%
Mathematics	18%
Biology	9%

QI5A

Is this your first year teaching PEAK?

N: 77

Choices	
Yes	5%
No	95%

QI5B

How many years have you been teaching materials from the PEAK program?

N: 73

Choices	
1	10%
2	51%
3	19%
4	10%
5	5%
6	1%
7	4%

QI6

Approximately how many students do you teach the PEAK program materials to per year?

Choices	
Less than 30 students	18%
30-39	49%
40-49	3%
50-59	1%
60-69	10%
70-79	3%
80-89	1%
90-99	3%
100 students or more	13%

QI7

How did you hear about the PEAK program?

Choices	
Educator conference or workshop	38%
Recommendation by a colleague	37%
By mail or email	18%
Online	3%
(Other)	4%

QSA1

How satisfied are you with the PEAK program overall?

Choices	
1 - Not at all satisfied	0%
2	0%
3	0%
4	9%
5	5%
6	29%
7 - Very satisfied	56%
Mean	**6.33**

QSA2

How likely are you to recommend the PEAK program to a colleague?

Choices	
1 - Not at all likely	0%
2	0%
3	0%
4	5%
5	6%
6	15%
7 - Very likely	73%
Mean	**6.56**

QSA4

Do any other teachers at your school use the PEAK curriculum?

Choices	
Yes	65%
No	26%
I don't know	9%

QSA4A

Why not?

N: 20

Choices	
I am the only teacher at my school who teaches a subject related to PEAK.	45%
They have no attended training	30%
I am the only teacher at my school who teaches at PEAK's grade level.	20%
Topics have been integrated into the wider school/district curriculum	5%
(Other)	5%
(Don't know)	5%

QET1

Have you designed any lesson plans or classroom activities to teach students about energy efficiency or energy conservation outside of the PEAK program?

Choices	
Yes	51%
No	49%
I don't know/I don't remember	0%

QET2

Has your school conducted any schoolwide efforts to educate students on energy efficiency or energy conservation outside of the PEAK program?

Choices	
Yes	38%
No	54%
I don't know/I don't remember	8%

QET3

How, if at all, did these efforts differ from the PEAK program, either in topics or methods?

N: 48

Choices	
School/district developed program	10%
Program less effective than PEAK materials	10%
Waste reduction/compost/recycling program	8%
Sustainable/renewable energy program	8%
Other utility program	4%

(Other)	4%
There were no differences between these efforts and the PEAK program	54%

QET4

Have you participated in any education programs other than PEAK that teach students about energy efficiency or energy conservation topics?

Choices	
Yes	23%
No	77%

QET5

What program(s) did you participate in?

N: 18

Choices	
The NEED project	22%
Green Schools	17%
WaterWise or Energy Wise	11%
Solar schools	11%
(Other)	39%
I don't know/I don't remember	6%

QET6E

Are you still participating in any of the following programs? (LivingWise, Green Schools, Energenius)

N: 3

Choices	
Green Schools	67%
No longer participating in any of them	33%

QT1

Did you attend the PEAK Teacher Orientation and Training?

Choices	
Yes	100%
No	0%

QT2A

How would you rate the PEAK Teacher Orientation and Training on:

Preparing you for teaching the lessons in the classroom

Choices	
1 - Not at all satisfied	0%
2	1%
3	0%
4	3%
5	14%
6	27%
7 - Very satisfied	55%
Mean	**6.31**

QT2B

How would you rate the PEAK Teacher Orientation and Training on:
Giving you hands-on practice with lab materials

Choices	
1 - Not at all satisfied	0%
2	0%
3	0%
4	1%
5	5%
6	32%
7 - Very satisfied	62%
Mean	**6.54**

QT2C

How would you rate the PEAK Teacher Orientation and Training on:
Training overall

Choices	
1 - Not at all satisfied	0%
2	0%
3	0%
4	4%
5	8%
6	31%
7 - Very satisfied	58%
Mean	**6.42**

QT3

Do you have any suggestions for ways the training sessions might be improved?

Choices	
Yes	13%
No	87%

QT4A

Materials provided
N: 10

Choices	
"Materials were sufficient"	10%
"Provide training materials for each teacher instead of materials for "pairs" of teachers during training."	10%
"Supplies provided"	10%
"The material provided is solid, don't feel I have to compensate too much."	10%
"The materials were great. I use them in my classroom to teach PEAK."	10%
None	50%

QT4B

Structure and organization of the training
N: 10

Choices	
Follow-up training	20%
More hands-on lab training	20%
"A full day going over all the components instead of the majority on the units"	10%
"The skeleton for the PD was very laid out."	10%
None	50%

QT4C

Amount of time spent on each topic
N: 10

Choices	
More time	40%
None	60%

QT4D

Presenter style and knowledge
N: 10

Choices	
Prepared/knowledgeable	20%
"From what I recall it was pleasant and sound."	10%
"More hands on"	10%
None	60%

QIC1

Approximately how many hours did you spend teaching PEAK program materials during the 2010-2011 school year?

Choices	
1-5 hours	6%
6-10 hours	27%
11-15 hours	23%
15-20 hours	31%
21-25 hours	8%
26-30 hours	3%
31+ hours	13%

QIC1A

And of the (QIC1 Response) hours, were they spread out over ...

Choices	
One week	0%
One month	13%
One quarter	38%
One semester	31%
The entire school year	18%

QIC2

Which PEAK units have you taught or do you plan to teach?

Choices	
Unit 1: Energy Resources	73%
Unit 2: Electrical Generation	50%
Unit 3: Greenhouse Gases	28%
Unit 4: Introduction to Natural Gas	14%
Unit 5: Insulation	33%
Unit 6: How Electricity Moves	72%
Unit 7: Circuits	78%
Unit 8: Exploring Peak Demand Time	56%
Unit 9: Electricity and Magnetism	73%
Unit 10: Using Electricity to Do Work	41%
Unit 11: A Healthy Energy Future	23%
All 11 units	13%

QIC2A

Why do you not teach the other units?

N: 68

Choices	
I don't have time to teach the other units.	81%
The other units do not fit the curricular requirements for my students' grade level.	29%
My students would not be interested in the other units.	4%
My students would not understand the other units.	4%
More focus on other units	3%
(Other)	3%

QIC3

Are there any PEAK units that you have taught in the past and will not teach again?

Choices	
Yes	6%
No	94%

QIC4

Which PEAK units do you no longer plan to teach?

N: 5

Choices	
Unit 1: Energy Resources	40%
Unit 2: Electrical Generation	0%
Unit 3: Greenhouse Gases	20%
Unit 4: Introduction to Natural Gas	20%
Unit 5: Insulation	0%
Unit 6: How Electricity Moves	0%
Unit 7: Circuits	0%
Unit 8: Exploring Peak Demand Time	20%
Unit 9: Electricity and Magnetism	0%
Unit 10: Using Electricity to Do Work	0%
Unit 11: A Healthy Energy Future	0%

QIC4A

Why do you no longer plan to teach these unit(s)?

N: 5

Choices	
My students were not interested in the unit(s)	40%
My students did not understand the unit(s)	20%
I don't have time to teach the units(s)	20%
The unit(s) do not fit the curricular requirements for my students' grade level	20%
(Other)	20%

QIC5

Are there any topics that the PEAK materials do not cover that you would like them to cover?

Choices	
Yes	5%
No	95%

QIC6

What topics?

N: 4

Choices	
(Other)	100%
"I would like to see PEAK go more deeply into topic of magnets. I also think it would be helpful to have a unit on batteries, and why they generate electricity even though they do not have magnets inside."	25%
"Include mini solar panels in the kits."	25%
"Maybe I haven't covered these units yet but emphasis on how to transform energy use at school. Also, using technology along with the curriculums so maybe a DVD companion to the units."	25%
"Weather with Electricity"	25%

QIC7

When you taught the PEAK curriculum, did you make any changes or additions to the lesson plan?

Choices	
Yes	49%
No	51%

QIC7A

What changes did you make?

N: 38

Choices	
Shortened/simplified/condensed	32%
Additional labs/hands on exercises	21%
PowerPoint/presentations	18%
Coordinated with textbook/required curriculum	18%

Modified/personalized lesson (general)	13%
Translated to another language	11%
Coordinated with other environmental activities on campus	5%
Did not use materials (broken)	3%
Additional items in kit	3%
(Other)	3%

QIC7B

Why did you make these changes?

N: 38

Choices	
Easier for students to understand	34%
Time constraints	18%
More in-depth learning	16%
Meeting standards	16%
Interactive learning	16%
Language needs	8%
Connecting to new topics	5%
(Other)	11%

QCS1

How would you rate your satisfaction with the overall support provided by the PEAK program staff?

Choices	
1 - Not at all satisfied	0%
2	0%
3	0%
4	1%
5	4%
6	26%
7 - Very satisfied	69%
Mean	**6.63**

QCS3

How often do you interact with PEAK program staff?

Choices	
More than once a week	0%
Once a week to once a month	5%
Once a month to once a semester	28%
Once a semester to once a year	45%
Less than once a year	21%
I've never interacted with PEAK program staff.	1%

QCS4

How often would you prefer to interact with PEAK program staff?

Choices	
More than once a week	0%
Once a week to once a month	10%

Once a month to once a semester	36%
Once a semester to once a year	44%
Less than once a year	9%
Never	1%

QSE1

How effective are the PEAK materials in educating your students about energy efficiency?

Choices	
1 - Not at all effective	0%
2	0%
3	0%
4	4%
5	8%
6	29%
7 - Very effective	59%
Mean	**6.44**

QSE3

What elements of the PEAK program did they enjoy most?

Choices	
Hands on activities/labs/experiments/materials (general)	69%
Building circuits	18%
Electricity and magnetism	13%
Building motors	12%
Website	6%
Motors unit	5%
Finding ways to save at home	5%
Games	5%
Energy conservation	4%
Assemblies/events	4%
Circuits unit	3%
(Other)	10%

QSE4

What elements of the PEAK program did they enjoy least?

Choices	
When there's too much written work	13%
Energy resources (PEAK Unit 1)	6%
Home activities	5%
The reading	5%
Prep time for lessons	4%
Green-house gas	3%
Background info	3%
The math	3%
Above students' grade level/too difficult for students	1%
(Other)	17%
Nothing/enjoyed everything	37%

(Don't know)	1%
(Refused)	5%

QSE2A

How much do you agree with the following statements:
My students were able to understand the PEAK materials.

Choices	
1 - Strongly disagree	0%
2	0%
3	1%
4	4%
5	21%
6	33%
7 - Strongly agree	41%
Mean	**6.09**

QSE2B

How much do you agree with the following statements:
My students were able to complete the lab activities.

Choices	
1 - Strongly disagree	0%
2	0%
3	3%
4	6%
5	17%
6	28%
7 - Strongly agree	46%
Mean	**6.09**

QSE2C

How much do you agree with the following statements:
My students learned about ways to save energy from the PEAK materials that they would not have learned otherwise.

Choices	
1 - Strongly disagree	0%
2	0%
3	0%
4	6%
5	15%
6	27%
7 - Strongly agree	51%
Mean	**6.23**

QSE2D

How much do you agree with the following statements:
The PEAK program materials were appropriate for my students' grade level.

Choices	
1 - Strongly disagree	0%
2	0%
3	5%
4	0%
5	23%
6	29%
7 - Strongly agree	42%
Mean	**6.04**

QSE2E

How much do you agree with the following statements:
The PEAK materials correlate to the California Content Standards.

Choices	
1 - Strongly disagree	0%
2	0%
3	1%
4	1%
5	10%
6	36%
7 - Strongly agree	51%
Mean	**6.35**

QSE2F

How much do you agree with the following statements:
The PEAK materials were easy to integrate into my instructional programming.

Choices	
1 - Strongly disagree	1%
2	1%
3	0%
4	5%
5	15%
6	41%
7 - Strongly agree	36%
Mean	**5.99**

QEK1

Have you and your students ever discussed actions that they could take to save energy at home?

Choices	
Yes	100%
No	0%

QEK2

What are the key actions that the PEAK program promotes for students to take at home, if any?

Choices

Peak demand times/times of use	32%
General awareness of consumption	31%
Turn off appliances/electronics when not in use	23%
Turning off lights	22%
Install CFLs	18%
Phantom load/energy vampires	10%
Energy efficient appliances	8%
Talking to family members	5%
Home energy assessments	4%
Reducing carbon footprint	3%
Renewables	3%
(Other)	9%
Nothing specifically	18%

QEK2A

How interested were your students in the PEAK take-home elements?

Choices	
1 – Not at all interested	0%
2	1%
3	4%
4	17%
5	33%
6	27%
7 - Extremely interested	18%
Mean	**5.35**

QEK3

Why not?

N: 0

Choices	
(Other)	0%

QEK4

Have you received feedback from parents/guardians on the PEAK take-home elements?

Choices	
Yes	15%
No	85%

QEK5

Was the feedback you received from parents positive, negative or mixed?

N: 12

Choices	
Positive	92%
Negative	0%
Mixed	8%

QC1

Have you received the PEAK Career Explorer guide or accessed the Career Explorer guide materials online?

Choices	
Yes	9%
No	91%

QC2A

How much do you agree with the following statements:
My students would find information about green careers interesting.
N: 71

Choices	
1 - Strongly disagree	0%
2	3%
3	6%
4	10%
5	34%
6	25%
7 - Strongly agree	23%
Mean	**5.41**

QC2B

How much do you agree with the following statements:
Information about green careers would be appropriate for my students' grade level.
N: 71

Choices	
1 - Strongly disagree	0%
2	6%
3	6%
4	15%
5	31%
6	21%
7 - Strongly agree	21%
Mean	**5.20**

QC3

Have you used the Career Explorer guide in your classroom or with your students?
N: 7

Choices	
Yes	14%
No	86%

QC4A

How much do you agree with the following statements:
The Career Explorer guide provides information that is appropriate for my students' grade level.
N: 7

Choices	
1 - Strongly disagree	0%
2	0%

3	0%
4	29%
5	43%
6	29%
7 - Strongly agree	0%
Mean	**5.00**

QC4B

How much do you agree with the following statements:

The Career Explorer guide provides information that is useful for my students.

N: 7

Choices	
1 - Strongly disagree	0%
2	0%
3	0%
4	29%
5	29%
6	43%
7 - Strongly agree	0%
Mean	**5.14**

QC4C

How much do you agree with the following statements:

The Career Explorer guide increased my students' awareness of green career opportunities.

N: 1

Choices	
1 - Strongly disagree	0%
2	0%
3	0%
4	0%
5	0%
6	100%
7 - Strongly agree	0%
Mean	**6.00**

QEV1

Has your class participated in any of the following PEAK events?

Choices	
School-wide assemblies	53%
Student contests	17%
Energy Appreciation Day	15%
PEAK Week	10%
I haven't participated in any of these events.	46%

QEV2

Does your class plan to participate in any of these events this year?

N: 36

Choices	
Yes	36%
No	64%

QEV3

Which events?

N: 13

Choices	
School-wide assemblies	54%
Student contests	46%
Energy Appreciation Day	31%
(Other)	8%

QEV4

Why not?

N: 23

Choices	
No time	61%
Lack of administrative/school support	17%
Not aware of events	17%
No single class of students	9%
No other teachers at school teaching PEAK	4%
(Other)	9%

QEV5

What would make it easier for other teachers to participate in these events?

N: 42

Choices	
More time	17%
More information/awareness	12%
Easier to coordinate schedules	10%
More training	10%
Earlier notice of events	5%
Small presentations from PEAK staff	5%
Easier access	2%
(Other)	10%
(Nothing/fine as it is)	19%
(Don't know)	10%
(Refused)	2%

QPR1

In what ways, if any, could the PEAK program be improved overall that you haven't already described?

Choices	
Additional materials for kits	9%
Improve quality of materials	3%
(Other)	8%
None/No additional ways	77%
(Don't know)	1%
(Refused)	3%

QPR2

If you no longer received assistance from the PEAK program (in the form of teaching materials, lab supplies, and staff support), do you think that you would continue to teach the SAME TOPICS that you are currently teaching through the program?

Choices	
Yes	50%
No	17%
Not sure	33%

QPR3

What topics would you continue to teach?

N: 39

Choices	
Electricity	97%
Energy saving actions	85%
Background on energy resources	69%
Alternative/Renewable resources	67%
Natural gas	38%
(Other)	5%

QPR5

What would you need in order to continue teaching these topics in the future without the PEAK program resources and assistance?

Choices	
Hands on materials/lab supplies	68%
Funding	14%
I wouldn't be able to teach any of these topics	8%
Time	6%
Guidance/staff support	6%
Assemblies	4%
(Other)	8%
(I don't need anything to teach these topics)	6%

QPD2

What type of training would you prefer to help you best teach energy efficiency concepts to your students?

Choices	
An in-person training where you learn from a live teacher and have the opportunity to practice some of the lessons and activities that would be asked of your students	68%
An online video-based training where you may learn from the trainer in a video at your own time and watch some examples of students or teachers doing the activities or receiving the lessons	27%
Written training documents for you to read on your own time	5%

QPD3

Which of the following would be the most effective way to teach energy efficiency topics in your classroom?

Choices	
Infusion of energy efficiency lessons into the main curriculum for the year	60%
Supplemental materials that are taught separately and used as needed	40%

QPD4

And which of those methods do you think you CAN teach at your school?

Choices	
I would be able to use either of these methods.	55%
Supplemental materials that are taught separately and used only as needed	26%
Infusion of energy efficiency lessons into the main curriculum for the year	19%

QPD5

Which of the following would be the most effective way to design energy efficiency lesson plans for your classroom?

Choices	
I choose one or more pre-designed lesson plans from among a list of specific energy efficiency topics.	83%
I design my own lesson plans on energy efficiency, with some guidance as needed.	10%
I receive one pre-designed lesson plan on energy efficiency that I can follow.	6%

QPD6

Which of the following activities would be MOST useful in teaching energy efficiency topics to your students?

Choices	
Lab activities	67%
School-wide assemblies or speakers	12%
School energy efficiency audits conducted by students	12%
Take-home energy kits (including items for students to install in their homes)	8%
Take-home posters including tips for ways to save energy	3%

PROGRAM SNAPSHOT

PEAK
The Energy Coalition

30+ years

Target audience: Grade 3-7, PG&E/SCE

Low-income emphasis: Incorporating low income schools into program

Overview of Goals

•**Education, Information and Analysis** of smart & sustainable energy management.
•**Conservation** of energy by exploring where energy is and identifying ways to conserve.
•**Efficiency** by learning about new and efficient technology and informing their communities through a CFL fundraiser.
•**Time Use Management & Demand Response** through labs and software, students chart energy use over the day
•**Self Generation** technologies and their applications.
•**Career exploration** through career profiles and green pathway discussions.

Description of Curriculum

•Aligned with grade-level **science, math, and language arts** standards.
•Covers 3rd -7th grade with **highest participation in 4th - 5th** due to unit on electricity and magnetism (required in 4th grade an tested in 5th)
•Up to **11 units** are offered.
•Curriculum focuses on **integrated demand side management.**

Description of Other Activities

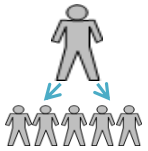
• Educational campaigns
• Lab assistance
• School assemblies and events
• Teacher Trainings
• CFL fundraisers (PG&E), HEES surveys (SCE)
• Collaboration across organizations

Program Reach

	PG&E	SCE
# students touched	12,344	17,890
# teacher trainings	17	27
# educational events	81	66
# school visits	112	71
# educational campaigns	4	4

Description of Key Target

Teachers within service territory who **teach 3rd to 7th grades,** with special focus on **4th and 5th grades**



ALIGNMENT WITH STRATEGIC PLAN: Summary of Changes Made

•Provides energy and environmental curricula and career development to students through **Career Exploration packet and assemblies.**
•Supports **development of teachers** as disseminators of energy awareness and knowledge.
•**Expanding to low-income schools** by adding more focus on Title 1 schools and schools with a high percentage of students in the school lunch program.
•Includes **service-learning components**.
•Collaborates with stakeholders, as well as **regional collaborations,** including Offices of Education, School Districts, etc.

Methods of Program Delivery

•**Teacher trainings** in advance of delivery
•**Flexible curriculum** that can be taught supplementally or integrate into year-long science curriculum
•**Ongoing lesson planning** and hands-on lab support
•**On site events** and assemblies to engage participating and non-participating students

Description of Level of Engagement

•High level of engagement with program, with ongoing **onsite assistance and classroom support,** events and teacher trainings.
•Teachers must teach **at least 4 of the 11 units**. Teachers reported a mean length of **1.8 hours per lesson** and **22 total hours** teaching the program per year.
•Administers pre- and post-tests to students, and collects activity logs /direct feedback from participating teachers.

Description of WE&T/Career Emphasis

The PEAK program has incorporated findings from the WE&T needs assessment to add a **Career Explorer unit.** This includes:
•Career Explorer **profiles,** Green **career pathways** discussions, and Coordination of **special speakers**

Description of WE&T/Low Income / Disadvantaged / Minority Emphasis

•Focus on low income, disadvantaged, minority students by **Title 1** and percentage of students receiving the free and **reduced lunch program.**

DETAILED YARDSTICK FINDINGS

In the following tables, shades of green = "excellent" to "good" scores; yellow to red = "moderate" to "very poor" scores.

Table 24. PEAK Learning Effectiveness Yardstick Results

LEARNING EFFECTIVENESS	PEAK
Objectives	**98%**
There are learning objectives (clearly stated student goals and outcomes)	100%
The learning objectives are specific, observable, and measurable	100%
The objective hierarchy is clearly delineated (TPOs and EOs)	91%
Objectives correspond with the Content Standards for California Public Schools and the California Environmental Principles and Concepts	100%
Lesson design	**99%**
Lessons' content directly supports the learning objectives	98%
Lessons directly support activities	100%
Lessons, collectively, employ a variety of media/modes (visual, aural, and kinesthetic)	100%
Lessons include estimated time frames for completion	100%
Activity design	**100%**
Directly support the learning objectives	100%
Directly support the lessons	100%
Use a variety of effective approaches to involving students	100%
Directly involve students in hands-on, learning-by-doing activities	95%
Enable the students to discover important information on their own.	100%
Enable the learners to contribute ideas	100%
Engage learners in problem solving	100%
Program materials	**83%**
Materials reflect a logical and coherent structure that facilitates efficient and effective teaching and learning	100%
Materials include cues to delineate the logical organization of the materials	100%
Materials' organizational cues facilitate readily identifying and locating functional areas (major topics, lessons, preparation guidelines, etc.)	100%
Materials have titles, headings, and subheadings (e.g., for chapters and sections)	100%
Materials have introductory paragraphs	100%
Materials use complete paragraphs, including a clear topic sentence, relevant support, and transitional words and expressions (e.g., "similarly," "in contrast," "As a result of…")	100%
Materials employ visual cues to engage and support the reader	100%
Materials employ typographical aids (boldface, italics, bullets, spacing)	100%
Materials employ relevant visual aids (illustrations, photographs, charts, graphs, maps, etc.)	100%

LEARNING EFFECTIVENESS	PEAK
Materials employ manageable, not overwhelming, visual stimuli	100%
Materials employ visual cues (highlighting, sidebars, icons, etc.) to indicate important terms and content	100%
Materials use a consistent method of orienting reader to the focus or intent of each section (focus questions, objectives, topic list, etc.)	100%
Materials use a consistent method of concluding each section	0%
Unit includes follow-up questions	100%
Unit includes comprehension questions	100%
Unit includes application questions	100%
Assessments	**100%**
Units, collectively, provide strategies and tools for continually measuring student achievement	100%
Units, collectively, include formative evaluation strategies and instruments	100%
Answer keys, suggested responses, or evaluation guidelines are provided for formative evaluations	100%
Units, collectively, include summative evaluation strategies and instruments	100%
Answer keys, suggested responses, or evaluation guidelines are provided for summative evaluations	100%
Summative instruments include items that sample the full range of learning objectives, including terminal performance and enabling objectives	100%
Summative instruments distinguish between those who can meet the learning objectives and those who do not	100%

Table 25. PEAK Support Yardstick Results

SCHOOL/TEACHER SUPPORT	PEAK
Implementation support	**95%**
Materials provide clear context for the program elements and materials (roadmap, overview of elements and relationship among them)	100%
Materials include a summary of units	100%
Overall for Unit Intro	100%
Unit includes an introduction, overview, or advanced organizer.	100%
Unit introduction, overview or advanced organizer describes overall focus of unit	100%
Unit introduction, overview or advanced organizer describes overall goal(s) or objective(s) — or both — of unit	100%
Unit introduction, overview or advanced organizer previews / overviews lessons included in unit	100%
Includes clear statement of which Content Standards are supported by lessons in the unit	100%
Unit provides logistical and delivery guidance	99%
Unit includes timing guidelines for lessons	100%
Unit includes recommendations or ideas for delivering lessons	100%
Unit include recommendations or ideas for reinforcing lessons	98%

SCHOOL/TEACHER SUPPORT	PEAK
Overall for Unit enhancing/expanding related learning	77%
Unit includes suggestions for enhancing and expanding related learning	91%
Include suggestions and guidance for group discussions (topics, questions, etc.)	100%
Include suggestions and guidance for follow-on activities	64%
Include references to supporting resources to expand knowledge (articles, web sites, etc.)	55%
Implementation flexibility	**90%**
Materials are modular	100%
Materials provide suggestions / guidance for adapting or tailoring delivery	100%
Design includes methods for extending learning beyond the classroom (to the rest of the school, to the home, to the community)	100%
Design/approach calls for manageable teacher prep time commitment	50%
Design/approach leverages students (teaching others, leading activities, etc.)	100%
Implementation sustainability	**73%**
Percentage of lessons that require NEITHER special materials nor equipment that must be purchased if used AFTER program participation has ended	0%
Aspects of the program are available to teachers AFTER program participation has ended	90%
Lessons and activities available to teachers AFTER program participation	100%
Special materials available to teachers AFTER program participation	50%
Special equipment available to teachers AFTER program participation	100%
Assemblies or speakers available to teachers AFTER program participation	100%
Events (field trip opportunities, contests, fairs, etc.) available to teachers AFTER program participation	na
Other aspects available to teachers AFTER program participation	100%
Aspects of the program are available to students (or parents or both) AFTER program participation has ended	100%
Self-guided lessons or activities available to students AFTER program participation	100%
Special materials available to students AFTER program participation	100%
Special equipment available to students AFTER program participation	100%
Events (field trip opportunities, contests, fairs, etc.) available to students AFTER program participation	na
Other aspects available to students AFTER program participation	100%
A variety of methods are used to provide access to relevant aspects of the program AFTER program participation has ended.	100%
Key resources are available online on web site (primary program materials)	100%
Key resources are downloadable from web site (primary program materials)	100%

SCHOOL/TEACHER SUPPORT	PEAK
Key resources delivered (via mail, etc.) upon request (primary program materials)	100%
Alignment with relevant Content Standards for California Public Schools	**99%**
Lessons and activities are targeted to specific grade levels	100%
Lessons and activities map directly to "Strands" or "Disciplines" defined in Standards	100%
There is a clear, logical linkage between lessons and activities to Standards goals (specified for each strand/discipline)	100%
Materials conform to EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria for Science	96%
Are scientifically accurate	93%
Refer to CA Science Content Standards (no reference to national standards or benchmarks or any standards other than CA Content Standards)	95%
Include examples directly supportive of the Standards that give direct attention to the responsibilities of all people to create and maintain a healthy environment and use resources wisely	100%
Support the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards	95%
Provide explicit instruction in science vocabulary that emphasizes the usage and meaning of common words in a scientific context	100%
Employ proper grammar and spelling	93%

Table 26. PEAK Learning Focus Yardstick Results

Learning Focus	PEAK
Development of energy efficiency concepts	**95%**
Units addressing energy efficiency concepts	**100%**
Includes elements (topics, lessons, activities) that address energy efficiency	100%
Positions the importance and benefits of saving energy	100%
Addresses measures and actions that can reduce energy consumption	91%
Includes examples of impact and benefits of energy efficiency measures and actions	91%
Compares and contrasts wasteful and energy efficient alternatives	91%
Includes specific calls to action to increase energy efficiency	100%
Development of concepts specific to renewable energy sources	**100%**
Units addressing concepts specific to renewable energy sources	**18%**
Includes elements (topics, lessons, activities) that address renewable energy	18%
Positions the importance and benefits of renewable energy	100%
Includes examples of renewable energy	100%

Learning Focus	PEAK
Includes examples of how renewable energy is generated	100%
Includes specific calls to action re. renewables	100%
Development of concepts specific to demand response and demand reduction	**83%**
Units addressing concepts specific to demand response and demand reduction	**45%**
Includes the concept of energy demand (vs. consumption)	45%
Includes elements (topics, lessons, activities) that address demand reduction	100%
Includes elements (topics, lessons, activities) that address demand response	80%
Positions the importance and benefits of reducing demand (general demand reduction or demand response or both)	80%
Includes examples of impact and benefits of demand response	80%
Includes examples of impact and benefits of sustained demand reduction	100%
Includes examples of impact and benefits of permanent load shift	40%
Includes specific calls to action to lowering demand	100%
Development of awareness, knowledge and appreciation (and pursuit) of green careers	**100%**
Unit includes elements (topics, lessons, activities) that address green careers	100%
Describes the personal benefits associated with green careers	100%
Describes the benefits to environment/society associated with green careers	100%
Presents role models in green careers	100%
Includes pointers to approaches or next steps to developing a green career	100%
Linkages to appropriate subject/content areas per unit	**3**
Average number of linkages per unit to content areas in addition to Math and Sciences	2
Math	1
Science	1
Sociology	1
Biology	0
Language Arts	1
Other	0

NARRATIVE DETAILS FROM ID REVIEW

Overall Findings

Table 27.PEAK Material Snapshot

Snapshot of Materials	
Grades addressed	3–7
Approx total hours of instruction	27 ("mainstream" lessons and activities only)
Number of units	11
Number of lessons	22

Overarching

The units of instruction target different age groups in 3–7 and (with a few exceptions) are realistic in approach to abilities of students at the various levels. Performance-based objectives appear well targeted and well supported by the design. Units are mostly topical in focus, and represent a good cross-section of relevant content areas. A strong "hands-on" element helps ensure students actively engage in the learning experience in a meaningful way.

Support of Teachers and Students

The lesson design and materials design support effective, flexible learning experiences.

- Lesson plans are generally complete, consistent, and well described.

  There are some places where a different approach to an activity is obvious, possibly the result of multiple authors. There also are some instances where presentation ideas are suggested midway through the unit when they would have been better introduced at the beginning.

- Learning objectives are clear and appropriate and support the relevant standards.
  - All units have a clear statement of learning objectives that describe what students will do as a result of the lessons.
  - Objectives are mapped to the Content Standards for California Public Schools and are consistent with the California EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria.
  - A "spot check" of lessons confirms that the mapping of objectives to Content Standards is accurate.

- Lessons and associated activities:
  - Support the learning objectives and are appropriate to the targeted grade level
  - Employ a variety of modes (to engage and support students with different styles)
  - Can be readily adapted to specific needs and situations using suggestions for tailoring activities and "extended learning" opportunities
  - Often "leverage" students (rather than being completely teacher-dependent) by having students teach others, lead activities, etc.

- Numerous "learning by doing" and "problem solving" activities — combined with follow-up questions for both comprehension and application — help ensure students "get" the concepts and encourage thinking and applying rather than simple rote responses.

- Teacher time commitment appears to be relatively high, and all of the student materials must be photocopied by the teacher because there are no student workbooks. Depending on copier cost and availability, this could limit the lessons that teachers are willing or able to deliver.

- Materials are complete and are well presented.

- A consistent, logical organizational scheme — along with summary information and organizational and visual cues —help guide the reader, focus attention, and make the materials easy to refer to.

Sustainability

The design is moderately "sustainable."

- Most lessons can be taught without special guidance other than is in the teacher's guide.
  - Teacher materials may be reused.
  - Student materials need to be photocopied by the teacher for each group of students.

- Many of the activities in each unit require special materials or equipment that may be relatively difficult or expensive for the teacher to obtain outside the program.

Energy-related Content (incl. "Green Careers")

In general, units strongly support a spectrum of energy-related topic areas:

- Energy Efficiency — All of the units (100%) address energy efficiency.

- Renewables — Two of the units (18%) address content and concepts specific to renewable energy sources.

- Demand — Nine (82%) of the units address content and concepts specific to demand response or demand reduction.

- Green Careers — All of the units (100%) of the units address awareness, knowledge, and appreciation (and pursuit) of green careers, though it appears that this is an area that is targeted for future development efforts.

  The Career Explorer Teacher's Guide was added after initial PEAK program materials were complete and uploaded to the PEAK website in August 2011. It presents one green job profile for each unit with 45-minute class discussion and journaling activity recommended.

Support of Standards

There are linkages to a variety of appropriate subject/content areas specified in the Content Standards.

Table 28. PEAK Units and Subject Areas

Subject Area	Percentage of Units Addressing
Math	73%
Science	100%
Sociology	64%
Biology	9%
Language Arts	91%
Other	0%

Assessment

There are both formative and summative evaluation strategies implemented in the PEAK materials.

- The formative evaluation approach appears to be manageable and appropriate.
- A brief review of the summative evaluation raises several concerns in its effectiveness as an instrument to assess students' achievement:
  - The pre- and post-tests are identical forms (ideally, they should be parallel, but not identical.
  - They do not represent the terminal performance objectives or a cross section of the enabling objectives represented by the units.
  - There are some psychometric3
  - 2.0. issues in the item design (non-parallel distractors, etc.).

LIVINGWISE

TEACHER SURVEY DATA FREQUENCIES

Survey Fielded: Feb. 27-Mar. 1, 2012

Respondent n: 71 for all questions unless otherwise noted

QI1

What grade level(s) do you teach?

Choices	
Kindergarten	0%
1st grade	0%
2nd grade	0%
3rd grade	0%
4th grade	3%
5th grade	4%
6th grade	99%
7th grade	8%
8th grade	8%
9th grade	0%
10th grade	0%
11th grade	0%
12th grade	0%
(Other)	1%

QI2

How many years have you been teaching?

Choices	
0-2	1%
3-5	7%
6-10	24%
11-15	24%
16-20	18%
21-25	13%
More than 25 years	13%
Mean	**15.75**

QI3

What subject or subjects do you teach?

N: 70

Choices	
General sciences	56%
Mathematics	46%
English or language arts	31%
Natural or physical sciences	23%
Multiple subjects/all subjects	19%
History or social studies	17%
Environmental sciences	10%
(Other)	6%

QI4A

To what grade level(s) do you teach the LivingWise program?

N: 11

Choices	
Kindergarten	0%
1st grade	0%
2nd grade	0%
3rd grade	0%
4th grade	0%
5th grade	9%
6th grade	91%
7th grade	0%
8th grade	0%
9th grade	0%
10th grade	0%
11th grade	0%
12th grade	0%
(Response to QI1)	18%

QI4B

During which subject or subjects do you teach the LivingWise program?

N: 50

Choices	
General sciences	62%
Natural or physical sciences	16%
Environmental sciences	12%
English or language arts	8%
History or social studies	4%
Mathematics	4%

QI5B

How many years have you been teaching materials from the LivingWise program?

Choices	
Less than 1 year/refused	4%
1-2 years	52%
3-5 years	38%
6-9 years	4%

10 years or more	1%
Mean	**2.73**

QI6

Approximately how many students do you teach the LivingWise program materials to per year?

Choices	
Less than 20 students	0%
20-34	28%
35-49	15%
50-74	20%
75-99	23%
100-149	11%
150 students or more	3%
Mean	**61.75**

QI7

How did you FIRST hear about the LivingWise program?

Choices	
By mail or email	51%
Recommendation by a colleague	45%
Educator conference or workshop	1%
Online	1%
(Other)	1%

QSA1

How satisfied are you with the LivingWise program overall?

Choices	
1 - Not at all satisfied	0%
2	0%
3	1%
4	6%
5	14%
6	38%
7 - Very satisfied	41%
Mean	**6.11**

QSA2

How likely are you to recommend the LivingWise program to a colleague?

Choices	
1 - Not at all likely	0%
2	1%
3	3%
4	3%
5	6%
6	24%
7 - Very likely	63%
Mean	**6.38**

QSA4

Do any other teachers at your school use the LivingWise materials?

Choices	
Yes	87%
No	7%
(Don't know)	6%

QSA4A

Why not?

N: 5

Choices	
I am the only teacher at my school who teaches a subject related to LivingWise.	60%
I am the only teacher at my school who teaches at LivingWise's grade level.	20%
(Other)	20%

QET1

Have you designed any lesson plans or classroom activities to teach students about energy efficiency or energy conservation outside of the LivingWise program?

Choices	
Yes	59%
No	39%
(Don't know/Don't remember)	1%

QET2

Has your school conducted any schoolwide efforts to educate students on energy efficiency or energy conservation outside of the LivingWise program?

Choices	
Yes	25%
No	65%
(Don't know/Don't remember)	10%

QET3

How, if at all, did your outside efforts differ from the LivingWise program, either in topics or methods?

N: 48

Choices	
There were no differences between these efforts and the LivingWise program	52%
Sustainable/renewable energy program	19%
Correlated more to textbook/required curriculum	17%
Waste reduction/compost/recycling program	10%
Other programs that promote general conservation	8%
Other utility program	6%
(Other)	8%

QET4

Have you participated in any education programs other than LivingWise that teach students about energy efficiency or energy conservation topics?

Choices	
Yes	28%
No	72%

QET5

What program(s) did you participate in?

N: 20

Choices	
WaterWise or Energy Wise	30%
California Education and the Environment Initiative (EEI)	15%
The NEED Project	15%
Green Schools	5%
PEAK	5%
(Other)	40%
(Don't know/Don't remember)	10%

QET6E

Are you still participating in any of the following programs?

N: 2

Choices	
Green Schools	50%
I'm not longer participating in any of them	50%

QT1

Did you read through the teacher instructions that came with the LivingWise materials?

Choices	
Yes	100%
No	0%

QT2A

How would you rate the instructions on preparing you for teaching the lessons in the classroom?

Choices	
1 - Not at all satisfied	0%
2	1%
3	0%
4	1%
5	11%
6	49%
7 - Very satisfied	37%
Mean	**6.17**

QIC1

Approximately how many hours did you spend teaching LivingWise classroom materials during the 2010-2011 school year?

Choices	
Less than 5 hours	21%
5-9	25%
10-14	30%
15-19	11%
20-29	6%
30-39	4%
40-49	0%
50 or more hours	3%
Mean	**12.20**

QIC1A

And of the (QIC1 response) hours, were they spread out over...

Choices	
One week?	17%
One month?	63%
One quarter?	10%
One semester?	7%
The entire school year?	3%

LQIC3

Do you plan to teach the LivingWise classroom materials again?

Choices	
Yes	92%
No	8%

QIC4A

Why do you no longer plan to teach the LivingWise classroom materials?

N: 6

Choices	
My students were not interested in them.	33%
I don't have time to teach them.	33%
They do not fit the curricular requirements for my students' grade level.	17%
(Other)	33%

QIC5

Are there any topics that the LivingWise materials do not cover that you would like them to cover?

Choices	
Yes	6%
No	94%

QIC6

What topics?

N: 4

Choices	
(Other)	100%

QIC7

When you taught the LivingWise materials, did you make any changes or additions to the lesson plan?

Choices	
Yes	45%
No	55%

QIC7A

What changes did you make?

N: 32

Choices	
Modified/personalized lessons (general)	50%
Shortened/simplified/condensed	31%
PowerPoint/Presentations	19%
Additional labs/hands on exercises	16%
Coordinated with textbook/required curriculum	9%
Additional items in kits	6%
(Other)	6%

QIC7B

Why did you make these changes?

N: 32

Choices	
More in-depth learning	22%
Easier for students to understand	19%
More interactive learning	16%
Time constraints	16%
Meeting standards	13%
Language needs	6%
Connecting to new topics	3%
(Other)	22%

QCS1

How would you rate your satisfaction with the support provided by the LivingWise program staff?

Choices	
1 - Not at all satisfied	0%
2	0%
3	1%
4	4%
5	11%
6	35%
7 - Very satisfied	48%

Mean	**6.24**

QCS3

How often do you interact with LivingWise program staff?

Choices	
More than once a week	4%
Once a week to once a month	3%
Once a month to once a semester	15%
Once a semester to once a year	38%
Less than once a year	23%
I've never interacted with LivingWise program staff.	17%

QCS4

How often would you prefer to interact with LivingWise program staff?

Choices	
More than once a week	4%
Once a week to once a month	1%
Once a month to once a semester	18%
Once a semester to once a year	58%
Less than once a year	14%
Never	4%

QSE1

How effective are the LivingWise materials in educating your students about energy efficiency?

Choices	
1 - Not at all effective	0%
2	0%
3	1%
4	3%
5	14%
6	32%
7 - Very effective	49%
Mean	**6.25**

QSE3

What elements of the LivingWise program and materials did they enjoy most?

Choices	
Energy-saving kit	58%
Finding ways to save at home	31%
Hands-on activities/labs/experiments/materials (general)	27%
Coloring book/drawing/worksheets	11%
Posters/stickers/visuals	6%
Everything/program materials in general	3%
Building circuits	1%
Website	1%
Video/multimedia stuff	1%

Like how easy it was to use and understand	1%
(Don't know/don't remember)	0%
(Other)	7%

QSE4

What elements of the LivingWise program and materials did they enjoy least?

Choices	
Home activities	23%
When there's too much written work	17%
The math	10%
The reading	4%
Background Info	3%
When there's too much information/too dense	1%
(Nothing/enjoyed everything)	30%
(Other)	10%
(Don't know/don't remember)	6%

QSE2A

How much do you agree with the following statements:
My students were able to understand the LivingWise materials.

Choices	
1 - Strongly disagree	0%
2	0%
3	1%
4	8%
5	15%
6	35%
7 - Strongly agree	39%
Mean	**6.03**

QSE2B

How much do you agree with the following statements:
My students were able to complete the student workbook activities.

Choices	
1 - Strongly disagree	0%
2	0%
3	6%
4	10%
5	24%
6	30%
7 - Strongly agree	31%
Mean	**5.70**

QSE2C

How much do you agree with the following statements:
My students learned about ways to save energy from the LivingWise materials that they would not have learned otherwise.

Choices	
1 - Strongly disagree	0%
2	0%
3	1%
4	3%
5	17%
6	24%
7 - Strongly agree	55%
Mean	**6.28**

QSE2D

How much do you agree with the following statements:
The LivingWise program materials were appropriate for my students' grade level.

Choices	
1 - Strongly disagree	0%
2	1%
3	0%
4	3%
5	14%
6	34%
7 - Strongly agree	48%
Mean	**6.23**

QSE2E

How much do you agree with the following statements:
The LivingWise materials correlate to the California Content Standards.

Choices	
1 - Strongly disagree	0%
2	1%
3	0%
4	3%
5	23%
6	27%
7 - Strongly agree	46%
Mean	**6.13**

QSE2F

How much do you agree with the following statements:
The LivingWise materials were easy to integrate into my instructional programming.

Choices	
1 - Strongly disagree	1%
2	1%
3	3%
4	7%

5	18%
6	28%
7 - Strongly agree	41%
Mean	**5.87**

QLW1

Have you distributed the LivingWise Kits to your students?

Choices	
Yes	89%
No	11%

QLW2

Were any of the kits that you received missing any items?

N: 63

Choices	
Yes	2%
No	98%

QLW3

How many kits had missing items?

N: 1

Choices	
1	100%

QLW4

What items were missing?

N: 1

Choices	
Flow rate test bag	100%

QLW5

Did you review the LivingWise kit with your students in your classroom?

N: 63

Choices	
Yes	100%
No	0%

QLW6

What did you discuss?

N: 63

Choices	
How to install or use the items	90%
How the items help save energy	95%
(Other)	11%

QLW7

Did your students install any of these items in their homes?

N: 63

Choices	
Yes	92%
No	0%
(Don’t know)	8%

QLW8

What percentage of the students in your class installed items in their homes?

N: 58

Choices	
Less than 25%	5%
26-50%	16%
51-75%	28%
76-100%	22%
(Don't know)	29%

QLW9

What items did your students install?

N: 58

Choices	
Compact fluorescent lamp (CFL)	95%
High-efficiency showerhead	74%
Bathroom faucet aerator	64%
Kitchen faucet aerator	62%
FilterTone Alarm	31%
LimeLite Night Light	19%
(Don't know)	3%

QLW10

Which item from the kits would you say your students generally liked the MOST?

N: 63

Choices	
Compact fluorescent lamp (CFL)	24%
Toilet leak detector tablets	24%
Digital thermometer	13%
Flow rate test bag	10%
High-efficiency showerhead	5%
LimeLite Night Light	5%
Mini tape measure	5%
Reminder stickers	5%
FilterTone Alarm	2%
Drip/rain gauge	2%
Teflon tape	2%
Cold water magnet	2%
(None of the items)	0%
(Don't know)	5%

QLW11

Which item from the kits would you say students your generally liked the LEAST?
N: 63

Choices	
FilterTone Alarm	19%
Drip/rain gauge	11%
High-efficiency showerhead	6%
Flow rate test bag	5%
Teflon tape	5%
Kitchen faucet aerator	5%
Mini tape measure	3%
Cold water magnet	3%
Bathroom faucet aerator	2%
Natural resource fact chart	2%
Toilet leak detector tablets	2%
Installation instructions	2%
Reminder stickers	2%
(None of the items)	5%
(Don't know)	30%

QEK1

Have you and your students ever discussed OTHER actions that they could take to save energy at home?

Choices	
Yes	86%
No	14%

QEK2

What are the key actions that the LivingWise program promotes for students to take at home, if any?

Choices	
Kits	92%
Save energy/the environment (general)	15%
Actions to take to be more efficient (general)	7%
Saving energy = saving money	6%
Water conservation	4%
(Other)	3%

QEK2A

How interested were your students in the LivingWise take-home elements?

Choices	
1 - Not at all interested	0%
2	1%
3	1%
4	3%
5	4%
6	24%
7 - Extremely interested	66%
Mean	**6.46**

QEK4

Have you received feedback from parents/guardians on the LivingWise take-home posters or student materials?

Choices	
Yes	46%
No	54%

QEK5

Was the feedback you received from parents positive, negative or mixed?

N: 33

Choices	
Positive	79%
Negative	0%
Mixed	21%

LQC1

Did the LivingWise materials you received include any information about green careers?

Choices	
Yes	27%
No	73%

QC2A

How much do you agree with the following statements:

My students would find information about green careers interesting.

N: 52

Choices	
1 - Strongly disagree	0%
2	2%
3	6%
4	2%
5	23%
6	46%
7 - Strongly agree	21%
Mean	**5.69**

QC2B

How much do you agree with the following statements:

Information about green careers would be appropriate for my students' grade level.

N: 52

Choices	
1 - Strongly disagree	0%
2	0%
3	8%
4	6%
5	19%
6	40%
7 - Strongly agree	27%

Mean	**5.73**

LQC3

Have you taught from any of the green careers information in your classroom or with your students?

N: 20

Choices	
Yes	55%
No	45%

LQC4A

How much do you agree with the following statements.

The green careers information is useful for my students.

N: 19

Choices	
1 - Strongly disagree	0%
2	5%
3	0%
4	26%
5	5%
6	32%
7 - Strongly agree	32%
Mean	**5.53**

LQC4B

How much do you agree with the following statements.

The green careers information is appropriate for my students' grade level.

N: 19

Choices	
1 - Strongly disagree	0%
2	5%
3	0%
4	21%
5	5%
6	42%
7 - Strongly agree	26%
Mean	**5.58**

LQC4C

How much do you agree with the following statements.

The green careers information increased my students' awareness of green career opportunities.

N: 10

Choices	
1 - Strongly disagree	0%
2	0%
3	10%
4	10%
5	20%
6	20%
7 - Strongly agree	40%
Mean	**5.70**

QPR1

In what ways, if any, could the LivingWise program be improved overall that you haven't already described?

Choices	
More activities (including online activities)	7%
Improve quality of materials	4%
Additional materials for kits	3%
More challenging/in-depth course topics	3%
(Other)	13%
(None/no additional ways)	70%

QPR4

If you did not receive the free energy saving kits from LivingWise, would you still be able to teach the same energy efficiency topics presented in the program?

Choices	
Yes	30%
No	38%
(Don’t know)	32%

QPR2

If you no longer received teaching materials and staff support from the LivingWise program, do you think that you would continue to teach the SAME TOPICS that you are currently teaching through the program?

Choices	
Yes	37%
No	38%
(Don’t know)	25%

QPR3

What topics would you continue to teach?

N: 26

Choices	
Energy saving actions	88%
Alternative/Renewable resources	85%
Background on energy resources	81%
Electricity	65%
Natural gas	46%
(Other)	4%

QPR5

What would you need in order to continue teaching these topics in the future without LivingWise program resources?

Choices	
Hands-on materials/lab supplies	55%
Worksheets/workbooks/coloring books	24%
Lessons/books/online teacher resources	23%
I wouldn't be able to teach any of these topics	8%
Time	3%
(I don't need anything to teach these topics)	6%
(Other)	3%
(Don't know)	7%

QPD2

What type of training would you prefer to help you best teach energy efficiency concepts to your students?

Choices	
Written training documents for you to read on your own time	20%
An in-person training where you learn from a live teacher and have the opportunity to practice some of the lessons and activities that would be asked of your students	34%
An online video-based training where you may learn from the trainer in a video at your own time and watch some examples of students or teachers doing the activities or receiving the lessons	45%
(None)	1%

QPD3

Which of the following would be the most effective way to teach energy efficiency topics in your classroom?

Choices	
Supplemental materials that are taught separately and used as needed	55%
Infusion of energy efficiency lessons into the main curriculum for the year	45%

QPD4

And which of those methods do you think you CAN teach at your school?

Choices	
Supplemental materials that are taught separately and used only as needed	27%
Infusion of energy efficiency lessons into the main curriculum for the year	14%
I would be able to use either of these methods	59%

QPD5

Which of the following would be the most effective way to design energy efficiency lesson plans for your classroom?

Choices	
I design my own lesson plans on energy efficiency, with some guidance as needed.	17%
I choose one or more pre-designed lesson plans from among a list of specific energy efficiency topics.	72%
I receive one pre-designed lesson plan on energy efficiency that I can follow.	11%

QPD6

Which of the following activities would be MOST useful in teaching energy efficiency topics to your students?

Choices	
Take-home energy kits (including items for students to install in their homes)	48%
Lab activities	45%
Take-home posters including tips for ways to save energy	4%
School-wide assemblies or speakers	3%

PROGRAM SNAPSHOT

LivingWise

Resource Action Programs;
Budget: $1.3 Million ($42/student)

6+
~1999-2001, Spring 2005 – present

Target audience: Grade 6, SCE and SCG

Minority emphasis: Incorporating low-income schools into program

Overview of Goals

•**SCE's Participation Goal** is to reach 33, 333 students and their households annually, supplying 16,667 LivingWise Kits, each school semester .
•**Energy Knowledge:** delivered through classroom instruction and at home audit and installation activities; measured by change in student pre- and post- tests.
•**Home Audits and Installation:** supported by instructional materials and completed by students and parents.

Description of Curriculum

•Aligned with **6th grade science and math** state standards.
•Teachers reported a mean teaching time of **12 hours in a 4-week period**. Topics include natural resources, renewable and non-renewable resources, etc. and culminate with conservation at home.
•Students get **direct install measures** (e.g., CFLs, aerators, etc.) and tools (e.g., gauges, thermometers, leak detector tablets) to measure energy in homes - serve as "lab" assignments/ "home activities" materials

Description of Other Activities

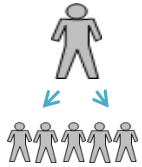
•Additional **classroom activities** (e.g., content-related puzzles, etc.)
•Website access

Reach of Program

Number of schools	360
Number of students	34,048
Number of teachers	766

Description of Key Target

6th grade teachers within SCE and SCG service territories



Savings (cumulative as of 1Q 2011 report)

Net Peak KW	61.04
Net kWh	397,372.7
Life Cycle kWh	3,725,782.5

ALIGNMENT WITH STRATEGIC PLAN: Summary of Changes Made

•**Green Careers:** Basic job-related terms per general lesson topics will be included in a new curriculum.
•**LI/Minority/Disadvantaged:** Now, 40% of the schools reached each year must serve low-income students.

Methods of Program Delivery

•Teachers **order materials**;
•Materials arrive **by mail** and may be delivered directly to the classroom;
•'Teachers teach and students take home **audit and installation kits;**
•Teachers use post tests to collect knowledge and installation info;
•Incented by grants for classroom materials, teachers return post tests to the program.

Description of Level of Engagement

•Materials designed for **self-orientation** and start-up.
•Due to teacher interest, program also made **kickoff presentations available.**
•Teachers **can contact** their program coordinators directly with specific questions as needed.

Description of WE&T/Career Emphasis

•Given the ages of the students, the career focus will be limited to the **inclusion of basic job-related terms** per the general lesson topics This will be included in a revised curriculum available in the fall 2011. Transition is ongoing – 27% of teachers said they had received green career materials in Feb. 2012.

Description of WE&T/Low Income / Disadvantaged / Minority Emphasis

•SCE created goal that **40% of the schools** reached each year must serve low-income students.

DETAILED YARDSTICK FINDINGS

In the following tables, shades of green = "excellent" to "good" scores; yellow to red = "moderate" to "very poor" scores.

Table 29. LivingWise Learning Effectiveness Yardstick Results

LEARNING EFFECTIVENESS	LIVINGWISE
Objectives	**94%**
There are learning objectives (clearly stated student goals and outcomes)	100%
The learning objectives are specific, observable, and measurable	75%
The objective hierarchy is clearly delineated (TPOs and EOs)	100%
Objectives correspond with the Content Standards for California Public Schools and the California Environmental Principles and Concepts	100%
Lesson design	**98%**
Lessons' content directly supports the learning objectives	100%
Lessons directly support activities	92%
Lessons, collectively, employ a variety of media/modes (visual, aural, and kinesthetic)	100%
Lessons include estimated time frames for completion	100%
Activity design	**78%**
Directly support the learning objectives	92%
Directly support the lessons	83%
Use a variety of effective approaches to involving students	58%
Directly involve students in hands-on, learning-by-doing activities	50%
Enable the students to discover important information on their own.	50%
Enable the learners to contribute ideas	75%
Engage learners in problem solving	67%
Program materials	**70%**
Materials reflect a logical and coherent structure that facilitates efficient and effective teaching and learning	100%
Materials include cues to delineate the logical organization of the materials	100%
Materials' organizational cues facilitate readily identifying and locating functional areas (major topics, lessons, preparation guidelines, etc.)	100%
Materials have titles, headings, and subheadings (e.g., for chapters and sections)	100%
Materials have introductory paragraphs	100%
Materials use complete paragraphs, including a clear topic sentence, relevant support, and transitional words and expressions (e.g., "similarly," "in contrast," "As a result of...")	100%
Materials employ visual cues to engage and support the reader	100%
Materials employ typographical aids (boldface, italics, bullets, spacing)	100%
Materials employ relevant visual aids (illustrations, photographs, charts, graphs, maps, etc.)	100%

Materials employ manageable, not overwhelming, visual stimuli	100%
Materials employ visual cues (highlighting, sidebars, icons, etc.) to indicate important terms and content	100%
Materials use a consistent method of orienting reader to the focus or intent of each section (focus questions, objectives, topic list, etc.)	50%
Materials use a consistent method of concluding each section	8%
Unit includes follow-up questions	63%
Unit includes comprehension questions	58%
Unit includes application questions	67%
Assessments	**0%**
Units, collectively, provide strategies and tools for continually measuring student achievement	0%
Units, collectively, include formative evaluation strategies and instruments	0%
Answer keys, suggested responses, or evaluation guidelines are provided for formative evaluations	na
Units, collectively, include summative evaluation strategies and instruments	0%
Answer keys, suggested responses, or evaluation guidelines are provided for summative evaluations	na
Summative instruments include items that sample the full range of learning objectives, including terminal performance and enabling objectives	na
Summative instruments distinguish between those who can meet the learning objectives and those who do not	na

Table 30. LivingWise Support Yardstick Results

SCHOOL/TEACHER SUPPORT	LIVINGWISE
Implementation support	**70%**
Materials provide clear context for the program elements and materials (roadmap, overview of elements and relationship among them)	100%
Materials include a summary of units	0%
Overall for Unit Intro	50%
Unit includes an introduction, overview, or advanced organizer.	100%
Unit introduction, overview or advanced organizer describes overall focus of unit	0%
Unit introduction, overview or advanced organizer describes overall goal(s) or objective(s) — or both — of unit	100%
Unit introduction, overview or advanced organizer previews / overviews lessons included in unit	0%
Includes clear statement of which Content Standards are supported by lessons in the unit	100%
Unit provides logistical and delivery guidance	92%
Unit includes timing guidelines for lessons	100%
Unit includes recommendations or ideas for delivering lessons	75%
Unit include recommendations or ideas for reinforcing lessons	100%
Overall for Unit enhancing/expanding related learning	67%
Unit includes suggestions for enhancing and expanding related learning	33%
Include suggestions and guidance for group discussions (topics, questions, etc.)	100%
Include suggestions and guidance for follow-on activities	100%

SCHOOL/TEACHER SUPPORT	LIVINGWISE
Include references to supporting resources to expand knowledge (articles, web sites, etc.)	33%
Implementation flexibility	**80%**
Materials are modular	100%
Materials provide suggestions / guidance for adapting or tailoring delivery	100%
Design includes methods for extending learning beyond the classroom (to the rest of the school, to the home, to the community)	100%
Design/approach calls for manageable teacher prep time commitment	100%
Design/approach leverages students (teaching others, leading activities, etc.)	0%
Implementation sustainability	**34%**
Percentage of lessons that require NEITHER special materials nor equipment that must be purchased if used AFTER program participation has ended	54%
Aspects of the program are available to teachers AFTER program participation has ended	51%
Lessons and activities available to teachers AFTER program participation	0%
Special materials available to teachers AFTER program participation	58%
Special equipment available to teachers AFTER program participation	95%
Assemblies or speakers available to teachers AFTER program participation	100%
Events (field trip opportunities, contests, fairs, etc.) available to teachers AFTER program participation	0%
Other aspects available to teachers AFTER program participation	na
Aspects of the program are available to students (or parents or both) AFTER program participation has ended	0%
Self-guided lessons or activities available to students AFTER program participation	0%
Special materials available to students AFTER program participation	0%
Special equipment available to students AFTER program participation	0%
Events (field trip opportunities, contests, fairs, etc.) available to students AFTER program participation	0%
Other aspects available to students AFTER program participation	na
A variety of methods are used to provide access to relevant aspects of the program AFTER program participation has ended.	33%
Key resources are available online on web site (primary program materials)	0%
Key resources are downloadable from web site (primary program materials)	0%
Key resources delivered (via mail, etc.) upon request (primary program materials)	100%
Alignment with relevant Content Standards for California Public Schools	**98%**
Lessons and activities are targeted to specific grade levels	100%
Lessons and activities map directly to “Strands” or “Disciplines” defined in Standards	100%
There is a clear, logical linkage between lessons and activities to Standards goals (specified for each strand/discipline)	100%
Materials conform to EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria for Science	90%
Are scientifically accurate	92%

SCHOOL/TEACHER SUPPORT	LIVINGWISE
Refer to CA Science Content Standards (no reference to national standards or benchmarks or any standards other than CA Content Standards)	100%
Include examples directly supportive of the Standards that give direct attention to the responsibilities of all people to create and maintain a healthy environment and use resources wisely	100%
Support the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards	50%
Provide explicit instruction in science vocabulary that emphasizes the usage and meaning of common words in a scientific context	100%
Employ proper grammar and spelling	100%

Table 31. LivingWise Learning Focus Yardstick Results

LEARNING FOCUS	LIVINGWISE
Development of energy efficiency concepts	**100%**
Units addressing energy efficiency concepts	**100%**
Includes elements (topics, lessons, activities) that address energy efficiency	100%
Positions the importance and benefits of saving energy	100%
Addresses measures and actions that can reduce energy consumption	100%
Includes examples of impact and benefits of energy efficiency measures and actions	100%
Compares and contrasts wasteful and energy efficient alternatives	100%
Includes specific calls to action to increase energy efficiency	100%
Development of concepts specific to renewable energy sources	**88%**
Units addressing concepts specific to renewable energy sources	67%
Includes elements (topics, lessons, activities) that address renewable energy	67%
Positions the importance and benefits of renewable energy	50%
Includes examples of renewable energy	100%
Includes examples of how renewable energy is generated	100%
Includes specific calls to action re. renewables	100%
Development of concepts specific to demand response and demand reduction	**57%**
Units addressing concepts specific to demand response and demand reduction	33%
Includes the concept of energy demand (vs. consumption)	33%
Includes elements (topics, lessons, activities) that address demand reduction	100%
Includes elements (topics, lessons, activities) that address demand response	0%
Positions the importance and benefits of reducing demand (general demand reduction or demand response or both)	100%
Includes examples of impact and benefits of demand response	0%
Includes examples of impact and benefits of sustained demand reduction	100%
Includes examples of impact and benefits of permanent load shift	0%

LEARNING FOCUS	LIVINGWISE
Includes specific calls to action to lowering demand	100%
Development of awareness, knowledge and appreciation (and pursuit) of green careers	**25%**
Unit includes elements (topics, lessons, activities) that address green careers	75%
Describes the personal benefits associated with green careers	0%
Describes the benefits to environment/society associated with green careers	100%
Presents role models in green careers	0%
Includes pointers to approaches or next steps to developing a green career	0%
Linkages to appropriate subject/content areas per unit	**2**
Average number of linkages per unit to content areas in addition to Math and Sciences	0
Math	1
Science	1
Sociology	0
Biology	0
Language Arts	0
Other	0

NARRATIVE DETAILS FROM ID REVIEW

NOTE:

The hardcopy materials provided by program staff do not match and are substantially different from electronic files (PDF) provided.

The Evaluation Team focused on the hardcopy, which appears to be the more current version. An example of the difference between the two versions:

The hardcopy has five major sections, targeted specifically to Grade 6:

1. Natural Resources
2. Energy
3. Electrical Energy
4. Water Conservation & Energy Efficiency
5. Conservation at Home

The electronic version has seven major sections, targeted to Grades 5 and 6:

1. Natural Resources
2. Renewable Resources
3. Non-Renewable *[sic]* Resources
4. Energy
5. How is *[sic]* Electricity Made?
6. Water Conservation & Energy Efficiency
7. Conservation at Home

Overall Findings

Table 32. LivingWise Materials Snapshot

Snapshot of Materials	
Grades addressed	5–6
Approx total hours of instruction	7 ("mainstream" lessons and activities only)
Number of units*	3
Number of lessons	5

* For the purposes of this evaluation, we grouped the LivingWise sections into three units: "Unit 1: Natural Resources" includes (1) Natural Resources, "Unit 2: Energy" includes (2) Energy and (3) Electrical Energy; "Unit 3: Conservation" includes (4) Water Conservation & Energy Efficiency and (5) Conservation at Home.

We initiated this scheme when we first started working — with the electronic files — and we were considering seven sections. Without grouping sections together, some sections would have had artificially low scores on some criteria. We maintained the scheme after we realized the hardcopy was the more current version. Grouping by "units" keeps the reviews across programs closer to parallel.)

Overarching

The learning materials take a predominantly "teacher-focused and passive" approach with the "mainstream" learning experience consisting mainly of reading and discussion. (Activities are

positioned as optional.) Although some details of the materials could use fine-tuning, overall they are well organized and well presented. It looks like the program would offer very effective learning experience if the optional activities are incorporated, and the teacher chooses to shift the focus of activities from teacher-led to student-led.

The LivingWise kit of energy saving devices likely is great fun for the students, and offers the opportunity for actual energy-savings at home, as well as a valuable learning experience for students. (Incorporating structured teacher follow-up on the "Home Survey (Home Activities)" component would help ensure that the intended learnings are achieved.)

Support of Teachers and Students

- Lesson plans could benefit from fine tuning.
  - Suggested class times appear to be too short. At 10 or 20 minutes, depending upon the lesson, the suggested timing generally:
    - Is insufficient for reading followed by meaningful discussions
    - Does not allow time for the (optional) demonstrations/activities
  - Some of the Teacher's Guide instructions are vague and do not explain what the teacher needs to know in order to lead a class discussion or what information the students are expected to come up with during the discussion.
  - Some of the "additional activities" don't have precedents in the lessons where they are used.

    The most challenging is an "energy cost calculator" segment with questions about how much it costs to run an air conditioner, computer, etc. There is no information on how much electricity the appliances use or how much one pays for a kWh of electricity, nor is it discussed at all except possibly in conjunction with (optionally) viewing a school utility bill.
- All units include "student-oriented" learning objectives that support the relevant standards.
  - Some objectives could be fine-tuned so they are specific, observable, and measurable.
  - Objectives are mapped to the Content Standards for California Public Schools and are consistent with the California EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria.

    The one notably weak area relative to support of the standards is related to the criterion, "Support the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards."

    Because all activities are positioned as "optional" and few of the activities directly involve learning-by-doing, the lessons generally do not support investigative and experimental skills.
  - A "spot check" of lessons confirms that the mapping of objectives to Content Standards is accurate.
- The lessons' content (reading) directly supports the learning objectives, and generally support the (optional) activities.

- The lesson design is predominantly "passive learning."
  - The primary focus of each lesson in four of the five sections (Sections 1 – 4) is having students read background material followed by a teacher led-discussion.

    Follow-up questions could be strengthened to better "test" and reinforce comprehension and application of key concepts.
  - Activities are referred to as "optional," and often are relatively passive from the student's perspective.
  - The teacher is often the primary "doer," with students having a relatively small role in some of the demonstrations.
  - Only about half of the units directly involve students in hands-on, learning-by-doing or allow students to discover information on their own.
- Teacher and student materials are visually interesting and are generally well presented.
  - A consistent, logical organizational scheme — along with organizational and visual cues — help guide the reader, focus attention, and make the materials easy to refer to.
  - Introductions could be strengthened to consistently orient the reader to the intent or focus of each section (focus questions, topic list, etc.)
  - It may also be beneficial to consider including section (or lesson) "wrap ups" the review key points and suggest appropriate "next steps" or extended learning opportunities.
- The overall design could benefit from being less "teacher dependent," incorporating learning experiences that would "leverage the students" in teaching others, leading activities, etc.

Sustainability

The design is relatively "sustainable," but there are some issues associated with "special materials" and "special equipment."

- Most lessons can be taught without special guidance other than is included in the teacher's guide. (This would be especially true if the teacher's guide were enhanced to address the occasional issues of lack of clear and complete guidance for discussions and activities.)
  - Teacher materials may be reused.
  - Student materials need to be replenished for each group of students.
- Several of the (optional) activities in each unit require special materials or equipment that may be relatively difficult or expensive for the teacher to obtain outside the program.

Energy-related Content (incl. "Green Careers")

The energy theme is developed throughout and there are interesting segments on how common everyday items (like the hamburger) relate to energy. In addition, the materials address other important topics:

- **Energy Efficiency** — All of the units (100%) address energy efficiency and do a great job positioning the importance, benefits, and "to dos" relative to energy efficiency.

- **Renewables** — Two of the three units (67%) address content and concepts specific to renewable energy sources. Both units are strong in providing examples and calls to action. The "Energy" unit could benefit from a stronger positioning of the importance and benefits of renewable energy (which is well addressed in the "Natural Resources" unit.

- **Demand** — One of the units (33%) address content and concepts specific to demand reduction, and does a good job of addressing the importance, benefits, and "to dos" relative to permanent load reduction.

  None of the units address demand response.

- **Green Careers** — All of the units (100%) address awareness, knowledge, and appreciation (and pursuit) of green careers, which is an integral element across all units.

  While the materials do a great job of positioning the benefits that green careers provide society as a whole, they could benefit from including:

  - Personal benefits associated with green careers
  - "Real life" role models of individuals who have green careers
  - Mention of the types of skills or education associated with the careers.

Support of Standards

Based on the mapping to the content standards provided in the materials, the lessons support only the math and science subject/content areas specified in the Content Standards.

Table 33. LivingWise Units and Subject Areas

Subject Area	Percentage of Units Addressing
Math	100%
Science	100%
Sociology	0%
Biology	0%
Language Arts	0%
CA Environmental Principles	0%
Other	0%

Assessment

There is little guidance for formative evaluation of students' achievements relative to the objectives, and no formal formative evaluation instruments included in the materials.

There is a pre- and post-survey, which appears to be intended to serve as a high-level summative assessment. However, the items on the survey do not reflect the terminal performance objectives or an appropriate cross-section of enabling objectives addressed by the units of instruction.

Miscellaneous

The strong focal point of the program is a LivingWise kit of energy saving devices for students to take home as part of the final lesson and install with their parents' help. There is an accompanying workbook for students to compute the energy savings they realize.

- Even with an initial "Dear Parent letter," there is no assurance that parents will support student learning in this way. (A parent meeting at Open House to get buy-in might be a workable option.)

- Although there are lots of computations in the activity book, there is no follow up at school for the students to bring back their books, check their arithmetic, or talk about the at-home process.

GREEN SCHOOLS

Unlike the other K-12 programs, the Green Schools findings are presented more qualitatively, due to our small sample size, the small participant pool, and the variable implementation of Green Schools from campus to campus.

DETAILED SUMMARY OF FINDINGS

The Green Schools program design differs from the other K-12 programs in that the program does not provide a pre-designed curriculum, but instead has teams design ways to implement the program schoolwide. These implementation plans can include curricular or extracurricular student activities, along with a schoolwide energy savings plan.

Participant Team Characteristics

Participant teams varied by school, but had a few consistent characteristics. Teams were consistent in the following areas:

- **Experience:** The interviewed team members were also moderately to highly experienced: All had at least 8 years of experience in their jobs, and most had at least 15 years of experience. Respondents who taught Green Schools curricular materials in a classroom setting had similar levels of experience: All had taught for at least 8 years, and most for at least 15 years.

- **Team makeup:** All Green Schools implementation teams included custodial and teaching staff, and most also included school administrative staff. The team members interviewed included eight teachers and five non-teacher staff: two school principals, one assistant principal, one school administrator, and one custodian.

- **Multi-grade program reach:** All interviewed team members said that they used Green Schools materials with multiple grade levels at their school. The 13 respondents combined reach all grade levels, K-12. They also said that Green Schools materials reach more grade levels than the team members themselves reach on their own. For example, one interviewed teacher said that they taught ninth- and tenth-grade physical science, but used Green Schools materials for both science classes and clubs that reached grades 9-12.

The teams also varied in some key ways. It is notable, however, that many of these variations are consistent with the Green Schools program design, which targets all K-12 grade levels and allows each Green Schools team to design their own materials and activities for their school.

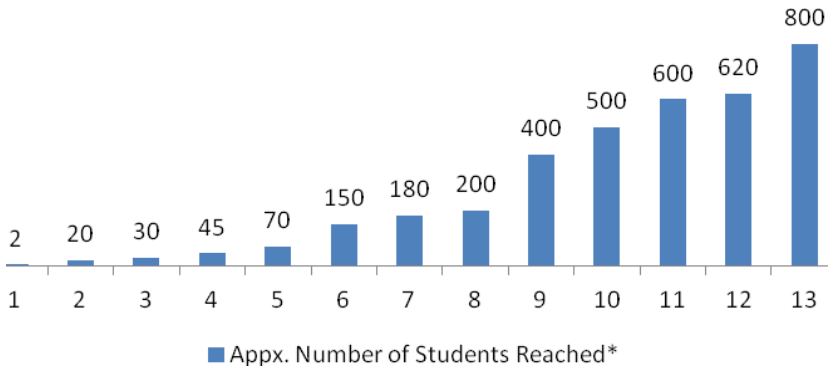
- **Grades and subjects taught:** Because Green Schools targets whole districts, individual school team members teach multiple grades. Our respondents included teachers and staff who worked with multiple grade levels: some worked with elementary school students only, some with middle school students only, and some with high school students only. Team members also said that Green Schools materials were used in multiple subjects: sciences most often (6 mentions), followed by English (3 mentions), and history (1 mention).

- **Team size:** Respondents described school teams varying in size from as few as two and as many as 33 team members, with most schools having three to five members on their teams.

- **Number of students reached:** Green Schools varied in the reach per school from highly concentrated to highly dispersed: One respondent said that only two students participated in

Green Schools, while several said that 500 or more students participated, as shown in Figure 12.

Figure 12. Green Schools Estimated Number of Students Reached by School*



*Note: These estimates are based on respondent self-report from Evaluation Team interviews.

Overall Green Schools Satisfaction

Respondents' overall satisfaction with the Green Schools program was moderately high: No respondents gave the Green Schools program a low rating (1-3), while most (eight respondents) were moderately satisfied (4-5 rating) and the rest (five respondents) were very satisfied (6-7 rating).

Respondents most commonly listed as the most positive aspects of the program:

- **Student involvement in energy saving activities:** All respondents said that they developed student activities related to Green Schools. Although the types of activities varied, they most commonly included student-led classroom audits and energy saving challenges. Interviewed team members said that these activities were students' favorites, giving them hands-on experience and visible results of their actions. One said that students enjoyed *"being responsible for taking care of the school,"* a *"leadership role."* Another said it was *"exciting to see the impact little changes can have on reducing usage and saving money."*

- **Expand reach through student audits**: Furthermore, student audits gave Green Schools the opportunity to expand its reach beyond directly targeted students. After being trained, student auditors would visit classrooms and not only provide opportunities for savings, but also do follow-up visits to monitor actions that were being taken.

Respondents most often mentioned the following difficulties with the program:

- **Developing classroom lessons:** Currently, the program provides a Road Map guide rather than pre-developed lesson plans in the vein of the other K-12 programs. Many interviewed teachers requested that they receive pre-designed materials that can be used immediately rather than develop their own lessons based on Green Schools' suggested materials.

  - Teachers who developed lessons said that the Green Schools materials were *"not easy to use"* and wanted something *"easy to integrate into the curriculum rather than create new lesson plans from scratch."* Teachers also mentioned that this created additional burdens for them in terms of time spent researching and developing lesson plans.

- A few teachers also expressed concern about lesson plans meeting state education standards, since they must develop these materials on their own based on Green Schools' suggested materials rather than pre-designed and standards-compliant lessons. One teacher pointed out that teachers must *"verify and modify [lessons] for compliance,"* and another mentioned that they did not develop lesson plans at all due to concerns about the lessons' standard compliance.

- **Need for administration buy-in:** One barrier to implementation was school administration buy-in to the program – few teachers said that this was an issue, but those did said that low buy-in from administrators limited their ability to implement the Green Schools program beyond a small group of students.

Non-Green Schools Energy Efficiency Teaching

About half of respondents said that they or their school had conducted energy efficiency or energy conservation activities outside of the Green Schools program. These activities usually focused on water conservation, recycling, or overall sustainability concepts. One teacher said that they relied on the science textbook only to teach energy efficiency and conservation topics.

Training and Program Support

Before the school year begins, Green Schools program staff host a one-day workshop session with team members in which they explain the program requirements, distribute key materials, and allow team members to develop their student activity and energy savings plans.

- **Most respondents (10 of 13) said that they attended the workshop session.** All who attended the workshop session said that other members of their team trained with them, including other teachers, custodial staff, and school administrators.

- **Respondents who did not attend the workshop were still involved with program implementation, and had other interactions with Green Schools staff.** One of these respondents still received a Road Map Guide and used this guide in developing classroom lessons. The other two respondents implemented Green Schools as an extracurricular activity only. All respondents said that they had follow-up interaction with Green Schools staff, such as the mid-year and end-of-year meetings, as well as continuing progress check-ins.

- **One training issue that teachers mentioned was that all teachers per district are taught in one session, regardless of what grades they teach.** This meant that high school and kindergarten teachers received nearly identical training and materials, even though their classroom needs are very different. Team members who worked at high schools were especially likely to call out a need for separate training; one described the training as *"too elementary school focused."*

Lesson Development

Instead of providing teachers with a pre-built curriculum or lesson plans, the Green Schools program provides teachers with suggested materials and has teachers design their own classroom lessons. This "Road Map" Guide outlines the key ideas and benchmarks, and also lists example lessons grouped into "primary" and "secondary" grade levels. However, our evaluation found that teachers need more formal guidance than the Green Schools materials currently provide. The Green Schools

lesson planning materials, therefore, should be considered, by both administrators and implementers, as only a placeholder.[24]

- **Most teachers who taught classroom lessons said that they used the Road Map Guide to develop their classroom materials; only one said they did not use the materials at all.** These teachers gave moderate ratings to the materials for being helpful in developing their lessons (ranging from 2 to 5, with most teachers giving a 4).

- **Several teachers also expressed concern about curricular activities meeting state education standards,** since they must develop these materials on their own based on Green Schools suggested materials rather than pre-designed and standards-compliant lessons. Of those who did develop lesson plans, none gave a rating higher than 4 (on a 1-7 scale) for ease of complying with state content standards.

Lesson/Activity Implementation

- **Only half of respondents said that their teams developed Green School classroom curricular activities.** Among those who did, all said that they taught on energy conservation and energy efficiency topics. Many also said that they covered energy transfer (conduction), uses of electricity, and energy resources in their Green Schools activities. A few team members said they covered uses of natural gas and peak demand.

    - Some teachers said they taught Green Schools materials during science classes, but others said that the materials were taught during English or history classes. This is consistent with the open-ended nature of the Green Schools materials, which allow teams to tailor materials to different subjects or extracurricular activities.

- **Respondents who did not develop classroom activities instead said that they implemented Green Schools activities as extracurricular activities** (such as clubs or student council activities). Green Schools student activities also include schoolwide assemblies and behavior-based challenges or competitions.

- Two respondents said that they were not involved in developing any student activities for the program. Among those who did, all said that they taught on energy conservation and energy efficiency topics. Many also said that they covered energy transfer (conduction), uses of electricity, and energy resources in their Green Schools activities. A few team members said they covered uses of natural gas and peak demand.

- The length of time devoted to Green Schools activities ranged from 10 hours per year to 80 hours per year. Most team members said that they conducted Green Schools activities for the entire year, but a small number said that they did not conduct them for the full year.

- Respondents said that they worked with both members of their team and non-members of their team in developing activities. Only one respondent said that they developed activities entirely on their own.

[24] In our Recommendations chapter, we discuss some alternatives for Green Schools to fit into the WE&T without necessarily developing its own pre-designed classroom materials.

- Green Schools teams had four audiences for non-curricular program activities: Districts, schools, classrooms, and small groups of students. Most interviewed team members said that their activities targeted only one or two of those audiences.
    - Districtwide, the main activity was interschool competitions. Schoolwide activities included assemblies and events such as carnivals, as well as intra-school savings challenges. The most commonly mentioned Green School activities included student-led classroom audits and energy-saving challenges such as inter-school savings competitions. Classroom activities included contests designing posters and door decorations; one activity involved taking students on a field trip to a water purification plant.
    - Several team members mentioned that they directly taught a small group of students to do classroom audits and follow-up monitoring. Although the group of students directly targeted and trained was small, these students often worked with classrooms to help them monitor and save energy, expanding program reach to those classrooms as well.

- **All but two of the respondents interviewed said that their students learned about take-home energy saving activities**, and most said that students were moderately to highly interested in these activities (rating 5 or higher on a 1-7 scale). These activities most often included turning off lights and electronics, as well as home energy audits similar to the ones conducted at school. Two teachers also mentioned that they had students review their energy bills to look for savings and ways to save.

- Team members mentioned the classroom audits and savings competitions as students' favorite activities. One said it was *"exciting to see the impact little changes can have on reducing usage and saving money."*

- Most teachers said that students did not have a least favorite activity, but one mentioned the classroom lessons and two mentioned issues relating to the audits. While the audits themselves were popular, these two students both mentioned that there was a built-in delay between audit training and actually receiving the materials to do the audits, which lowered student enthusiasm.

Green Career Development

Because of the open-ended nature of Green Schools materials, the Green Schools teams have had to make the fewest changes to integrate green career development into their activities. Rather than requiring a new, formal guide to be developed, it is simply another suggested topic for teams to integrate into their activities.

- **More than half of respondents (8) said that their Green Schools activities included green career activities.** The green career activities that respondents described varied. The most common green career activities included having a visiting speaker in a green career (4 mentions), and also having students do a research project on potential green careers (4 mentions). Several also said that they had conducted Student Energy Auditor Training sessions for groups of 4-25 students.

- **Respondents who developed green career activities said that Green Schools played at least some role in the development of these activities,** either through the Road Map Guide materials or through direct work with the Green Schools staff. Several respondents mentioned that Green Schools staff put them in touch with speakers or provided direct guidance for developing activities.

Energy Savings Plans

Most respondents (10 out of 13) said that their school had developed an energy savings plan. Two additional respondents said they did not know about an energy savings plan, but the school may have developed one without their participation. All respondents who said they developed an energy savings plan said they have also implemented it.

Program Sustainability

Because teachers develop their own materials and activities, the program is most easily sustained through teachers reusing those materials. Furthermore, any equipment upgrades that the school makes while participating in Green Schools will stay in place even if the Green Schools program is no longer at the school. However, some teachers said that sustaining the program would be difficult without the in-depth Green Schools program support.

- **More than half of respondents (8) said that they would continue to teach energy efficiency topics without Green School staff support or materials.** Most said that they would continue to teach energy saving actions, as well as electricity and alternative/renewable resources. Two mentioned that they would also continue teaching green careers topics.

- **To continue teaching these topics, respondents mentioned pre-designed, standards-compliant materials and administration buy-in to activities.** A few also mentioned they would need Green Schools' resources for tracking savings data and contacting potential speakers. However, one said that they need outside guidance; if they are not held accountable for their goals, the school and administrators *"will gravitate to other priorities."*

PROGRAM SNAPSHOT

Green Schools

Alliance to Save Energy
Budget: $2.3 million

11 years

Target audience: Grade K-12, SCE terr.

Minority emphasis: 50% participating schools in LI and minority communities

Overview of Goals

Key objectives:
•**Help schools take energy saving actions through new measures and behaviors at the campus:** Help schools identify changes to make for direct energy savings
•**Provide student lessons with an emphasis on "hands-on learning opportunities":** Classroom lab activities as well as school-wide assemblies on energy efficiency topics
•**Career exploration:** For all students, green career days and talks from people with EE-related jobs. For middle and high schoolers, also training to become student energy auditors at the school (which also helps identify additional savings opportunities).

Description of Curriculum, if any

Program does not have strict curricular requirements – provides over 200 possible lessons (all of which are CA standards compliant) that teachers may choose from.

Description of Other Activities

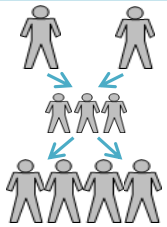
•**Career days** and **assemblies on EE topics** are its main additional activities.
•Also encourages schools to **involve students in energy usage changes** on campus.
•For older students, offers student energy auditor training (SEAT) courses.

Reach of Program

Number of Schools Per Year	65
First-year schools	46
Second-year schools	16
Mentor schools	3
Number of Teachers	110
Number of Custodians	65
Number of Participating Students	57,601

Description of Key Target

•Directly target administrators, who gather a **team of teachers and custodians**, and through them indirectly target **students**
•Also goal for students to expand reach to **families** and wider **community**



ALIGNMENT WITH STRATEGIC PLAN: Summary of Changes Made & Timing

•Added **career exploration** and training to key program objectives in the 2010-2012 cycle
•Goal of **50% of participating schools in low-income communities** based on students' School Lunch Program participation
  •However, not clear which schools meet the standard or what % School Lunch is standard for LI

Methods of Program Delivery

•Required **training and planning** period for participating teachers and custodians
•Teachers then implement the plans in the **classroom,** while custodians conduct energy efficiency **upgrades**
  •**Extra-curricular student activities** such as school audits
  •**Ongoing (monthly) contact** with the program during the school year
•Program also requires **community events** on EE topics in each school district and at least one activity per year on EE careers

Description of Level of Engagement

•**Year-long commitment** to program activities (team members reported about 34 total hours)
•Designed for participants to **develop their own EE action plans.** This increases engagement in two ways:
•Engages actors by making them take an more **active role** in finding ways to save
•Identify savings opportunities in the **wider community** to expand program reach (such as families, local government, and local businesses)

Description of WE&T/Career Emphasis

•Requires **EE career activities** such as career fairs and sponsors talks from people in EE fields.
•For older students, provides **student energy auditor training (SEAT)** with a goal of providing real-world professional training

DETAILED YARDSTICK FINDINGS

In the tables below, shades of green = "excellent" to "good" scores; yellow to red = "moderate" to "very poor" scores.

Table 34. Green Schools Learning Effectiveness Yardstick Results

LEARNING EFFECTIVENESS	GREEN SCHOOLS
Objectives	**33%**
There are learning objectives (clearly stated student goals and outcomes)	100%
The learning objectives are specific, observable, and measurable	25%
The objective hierarchy is clearly delineated (TPOs and EOs)	0%
Objectives correspond with the Content Standards for California Public Schools and the California Environmental Principles and Concepts	0%
Lesson design	**96%**
Lessons' content directly supports the learning objectives	100%
Lessons directly support activities	100%
Lessons, collectively, employ a variety of media/modes (visual, aural, and kinesthetic)	100%
Lessons include estimated time frames for completion	83%
Activity design	**97%**
Directly support the learning objectives	100%
Directly support the lessons	100%
Use a variety of effective approaches to involving students	92%
Directly involve students in hands-on, learning-by-doing activities	100%
Enable the students to discover important information on their own.	100%
Enable the learners to contribute ideas	96%
Engage learners in problem solving	75%
Program materials	73%
Materials reflect a logical and coherent structure that facilitates efficient and effective teaching and learning	100%
Materials include cues to delineate the logical organization of the materials	100%
Materials' organizational cues facilitate readily identifying and locating functional areas (major topics, lessons, preparation guidelines, etc.)	100%
Materials have titles, headings, and subheadings (e.g., for chapters and sections)	100%
Materials have introductory paragraphs	100%
Materials use complete paragraphs, including a clear topic sentence, relevant support, and transitional words and expressions (e.g., "similarly," "in contrast," "As a result of...")	100%
Materials employ visual cues to engage and support the reader	79%
Materials employ typographical aids (boldface, italics, bullets, spacing)	100%
Materials employ relevant visual aids (illustrations, photographs, charts, graphs, maps, etc.)	17%

LEARNING EFFECTIVENESS	GREEN SCHOOLS
Materials employ manageable, not overwhelming, visual stimuli	100%
Materials employ visual cues (highlighting, sidebars, icons, etc.) to indicate important terms and content	100%
Materials use a consistent method of orienting reader to the focus or intent of each section (focus questions, objectives, topic list, etc.)	100%
Materials use a consistent method of concluding each section	0%
Unit includes follow-up questions	60%
Unit includes comprehension questions	21%
Unit includes application questions	100%
Assessments	**0%**
Units, collectively, provide strategies and tools for continually measuring student achievement	0%
Units, collectively, include formative evaluation strategies and instruments	0%
Answer keys, suggested responses, or evaluation guidelines are provided for formative evaluations	na
Units, collectively, include summative evaluation strategies and instruments	0%
Answer keys, suggested responses, or evaluation guidelines are provided for summative evaluations	na
Summative instruments include items that sample the full range of learning objectives, including terminal performance and enabling objectives	na
Summative instruments distinguish between those who can meet the learning objectives and those who do not	na

Table 35. Green Schools Support Yardstick Results

SCHOOL/TEACHER SUPPORT	GREEN SCHOOLS
Implementation support	46%
Materials provide clear context for the program elements and materials (roadmap, overview of elements and relationship among them)	0%
Materials include a summary of units	0%
Overall for Unit Intro	25%
Unit includes an introduction, overview, or advanced organizer	33%
Unit introduction, overview, or advanced organizer describes overall focus of unit	100%
Unit introduction, overview, or advanced organizer describes overall goal(s) or objective(s), or both, of unit	0%
Unit introduction, overview, or advanced organizer previews / overviews lessons included in unit	100%
Unit includes clear statement of which Content Standards are supported by lessons in the unit	0%
Unit provides logistical and delivery guidance	90%
Unit includes timing guidelines for lessons	83%
Unit includes recommendations or ideas for delivering lessons	100%
Unit includes recommendations or ideas for reinforcing lessons	88%
Overall for Unit enhancing/expanding related learning	100%
Unit includes suggestions for enhancing and expanding related learning	100%
Include suggestions and guidance for group discussions (topics, questions, etc.)	100%

SCHOOL/TEACHER SUPPORT	GREEN SCHOOLS
Include suggestions and guidance for follow-on activities	100%
Include references to supporting resources to expand knowledge (articles, web sites, etc.)	100%
Implementation flexibility	**90%**
Materials are modular	100%
Materials provide suggestions / guidance for adapting or tailoring delivery	100%
Design includes methods for extending learning beyond the classroom (to the rest of the school, to the home, to the community)	100%
Design/approach calls for manageable teacher prep time commitment	50%
Design/approach leverages students (teaching others, leading activities, etc.)	100%
Implementation sustainability	**52%**
Percentage of lessons that require NEITHER special materials nor equipment that must be purchased if used AFTER program participation has ended	54%
Aspects of the program are available to teachers AFTER program participation has ended	55%
Lessons and activities available to teachers AFTER program participation	100%
Special materials available to teachers AFTER program participation	79%
Special equipment available to teachers AFTER program participation	98%
Assemblies or speakers available to teachers AFTER program participation	0%
Events (field trip opportunities, contests, fairs, etc.) available to teachers AFTER program participation	0%
Other aspects available to teachers AFTER program participation	na
Aspects of the program are available to students (or parents or both) AFTER program participation has ended	0%
Self-guided lessons or activities available to students AFTER program participation	0%
Special materials available to students AFTER program participation	0%
Special equipment available to students AFTER program participation	0%
Events (field trip opportunities, contests, fairs, etc.) available to students AFTER program participation	0%
Other aspects available to students AFTER program participation	na
A variety of methods are used to provide access to relevant aspects of the program AFTER program participation has ended.	100%
Key resources are available online on website (primary program materials)	100%
Key resources are downloadable from website (primary program materials)	100%
Key resources delivered (via mail, etc.) upon request (primary program materials)	100%
Alignment with relevant Content Standards for California Public Schools	**41%**
Lessons and activities are targeted to specific grade levels	100%
Lessons and activities map directly to “Strands” or “Disciplines” defined in Standards	0%
There is a clear, logical linkage between lessons and activities to Standards goals (specified for each strand/discipline)	0%
Materials conform to EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria for Science	64%

SCHOOL/TEACHER SUPPORT	GREEN SCHOOLS
Are scientifically accurate	100%
Refer to CA Science Content Standards (no reference to national standards or benchmarks or any standards other than CA Content Standards)	0%
Include examples directly supportive of the Standards that give direct attention to the responsibilities of all people to create and maintain a healthy environment and use resources wisely	33%
Support the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards	50%
Provide explicit instruction in science vocabulary that emphasizes the usage and meaning of common words in a scientific context	100%
Employ proper grammar and spelling	100%

Table 36. Green Schools Learning Focus Yardstick Results

LEARNING FOCUS	GREEN SCHOOLS
Development of energy efficiency concepts	**100%**
Units addressing energy efficiency concepts	**33%**
Includes elements (topics, lessons, activities) that address energy efficiency	33%
Positions the importance and benefits of saving energy	100%
Addresses measures and actions that can reduce energy consumption	100%
Includes examples of impact and benefits of energy efficiency measures and actions	100%
Compares and contrasts wasteful and energy efficient alternatives	100%
Includes specific calls to action to increase energy efficiency	100%
Development of concepts specific to renewable energy sources	**75%**
Units addressing concepts specific to renewable energy sources	**33%**
Includes elements (topics, lessons, activities) that address renewable energy	33%
Positions the importance and benefits of renewable energy	100%
Includes examples of renewable energy	100%
Includes examples of how renewable energy is generated	0%
Includes specific calls to action re. renewables	100%
Development of concepts specific to demand response and demand reduction	
Units addressing concepts specific to demand response and demand reduction	**0%**
Includes the concept of energy demand (vs. consumption)	0%
Includes elements (topics, lessons, activities) that address demand reduction	na
Includes elements (topics, lessons, activities) that address demand response	na
Positions the importance and benefits of reducing demand (general demand reduction or demand response or both)	na
Includes examples of impact and benefits of demand response	na
Includes examples of impact and benefits of sustained demand reduction	na
Includes examples of impact and benefits of permanent load shift	na

LEARNING FOCUS	GREEN SCHOOLS
Includes specific calls to action to lowering demand	na
Development of awareness, knowledge, and appreciation (and pursuit) of green careers	**100%**
Unit includes elements (topics, lessons, activities) that address green careers	33%
Describes the personal benefits associated with green careers	100%
Describes the benefits to environment/society associated with green careers	100%
Presents role models in green careers	100%
Includes pointers to approaches or next steps to developing a green career	100%
Linkages to appropriate subject/content areas per unit	**2**
Average number of linkages per unit to content areas in addition to Math and Sciences	1.0
Math	.67
Science	.67
Sociology	.33
Biology	.33
Language Arts	.33
Other	0

NARRATIVE DETAILS FROM ID REVIEW

Overall Findings

Table 37. Green Schools Material Snapshot

Snapshot of Materials	
Grades addressed	K–12
Approx total hours of instruction	42 ("mainstream" lessons and activities only)
Number of units*	6 (3 primary; 3 secondary)
Number of lessons	22 (12 primary; 10 secondary)

* Because the primary focus of Green Schools is the "school energy team's" activities, it is not structured in a manner that readily lends itself to logical grouping of lessons into units of instruction.

However, in order to have roughly parallel evaluation focus between the four programs, we needed to compare "units with units" (logical groupings of lessons). Therefore, we grouped the 22 Green Schools lessons into six units based on the overall content focus. We defined the following three "units" for the primary and for the secondary lessons: Energy Efficiency, Environmental Awareness, and Green Jobs.

Overarching

It appears that the primary focus of Green Schools is the "school energy team's" activities, which are targeted to lowering the schools kWh, rather than teaching all students in a given class. (The lessons seem to be added almost as an afterthought.)

Primary and secondary programs have many of the same lessons, which are not tailored for the ages of the students.

The major strength of the lessons — that they were contributed by many teachers who had used them successfully in their own classrooms — also leads to several of the concerns regarding the lessons: They are not presented in a standard, coherent manner and reflect varying degrees of completeness and accuracy of teacher guidance.

Had they been edited carefully to standardize format, to decrease or increase complexity depending on the ages of the targeted students, and to make sure that they were complete, these would have been much more effective. [This is like publishing Aunt Gloria's cookie recipe: it needs to be tested first by people who don't know that everyone in the family expects "nuts" to mean black walnuts and that the baking temperature needs to be lower or the cookies will spread out too much.]

Support of Teachers and Students

- Lesson plans could benefit from fine-tuning, as noted above.
  - Lessons have a variety of formats and presentation styles.
    - There is inconsistency with content; i.e., some explanations are thorough, some omit key pieces of information, some make it easy for the teacher to know how to prepare, some assume a prior familiarity with the activity.

- It would be clearer if the lesson structure were standardized, and all steps were clearly documented, and all materials were listed as "teacher supplied" or "in Green Schools Kit."

- Participation requires a significant teacher time investment.

  We estimate that the teacher time commitment for the energy team is at least 20 hours.

  Adding any of the lessons, especially those that require background information or preparing materials, would add more time.

  - Green Schools is primarily focused on creating a school energy team who will assess energy use and savings potential and share their new knowledge with peers, teachers, family and the community.
    - After attending an orientation workshop and learning about terminology and how to run the program, the teacher must explain the concept and procedures to the students.
    - The teacher prep time commitment can vary widely, depending on which suggested activities are selected, and whether the teacher is able to do some or most of the activities with the student team during class while the other kids are busy with assignments or whether the teacher must use recess, lunch, or after-school hours.
  - After the initial workshop, teachers are likely to need an hour or more to plan a student assembly and at least that long to plan lessons for the year, which incorporate the program.
    - If the energy team is made up of students from multiple classrooms, the sponsoring teacher will need several 30-minute outside-of-class meetings with them to plan their energy walk-through of the school, to coach them for two class presentations, to help them plan a campaign to educate parents and the community.
    - Data collection and uploading are required after several team activities; mid- and end-of-year reporting is required.

- While all units have some statement of learning objectives, most of them are inappropriate as performance-oriented learning objectives.

  - Only 25% of the units have objectives that are specific, observable, and measurable. The stated objectives often they begin with phrases such as, "Students will learn…" or "Students will discuss…" and it's impossible to know if they actually learned anything.
  - Several lessons involve preliminary class discussions to focus a subsequent activity but the roadmap books often don't explain what information is supposed to be brought out or what the teacher should be guiding the students to figure out in the discussion.

- Lessons and activities have some innovative approaches to valuable learning experiences, but seem to lack clarity and coherence.

  - Lessons and activities appear to support the inferred intent of the objectives.
  - Activities do reflect a variety of learning modes, but could take better advantage of the Green School Kit items.

  - The review team was not provided a list of Green Schools Kit contents; however, such a list is included with the Tool Kit itself. Although we did not receive the list, it seems likely that there are a variety of tools included--far more different kinds of equipment than the watt meter and thermometers that are mentioned in the lessons.

  - Experiments and activities could utilize a lot more "real" science and fewer paper models.

- Many lessons are focused on measuring how much energy is used and figuring out how to save energy. However, few lessons at either level (primary or secondary) have any information about renewable resources and demand reduction, which would be a logical extension of the topic of energy efficiency.

- Although lessons and activities are positioned as targeted for specific grade levels, it appears little thought has gone into actually ensuring the content and activities are grade-appropriate. (As noted earlier, many of the lessons for primary and secondary students are identical — or virtually identical, with minor formatting changes being the only difference.)

➢ Materials

- While the organization of the materials make sense if the primary focus of the program is the energy team's kWh reduction activities, the Roadmap Guides are difficult to navigate if the primary focus in teaching the lessons found in the materials.

- The materials would benefit from increased use of visual cues and a more consistent organization and presentation of the lessons.

Sustainability

The design is relatively low in "sustainability" in terms of the apparent primary focus of the program (the energy team's efforts to lower the school's kWh). The elements focused on education of the "full population" (students in a given grade) are relatively "sustainable."

➢ Most lessons can be taught without special guidance other than is included in the teacher's guide. (This would be especially true if the teacher's guide were enhanced to address the issues cited elsewhere in this summary.)

- Teacher materials may be reused.

- There are no student workbooks; the teacher is expected to photocopy pages for many of the lessons.

➢ Several of the (optional) activities in each unit require special materials or equipment that may be relatively difficult or expensive for the teacher to obtain outside the program.

Energy-related Content (incl. "Green Careers")

In general, units strongly support energy efficiency concepts, with lesser support of other energy-related topics.

➢ **Energy Efficiency** — The majority of the lessons address energy efficiency (83% primary; 60% secondary). In general, the energy efficiency lessons do a good job in addressing key points relevant to the topic (benefits, actions, comparison to "wasteful" practices and technologies, etc.)

- **Renewables** — A few lessons in the "Energy" units address content and concepts specific to renewable energy sources. The content addresses the benefits and gives examples of renewable energy — as well as includes specific calls to action.
- **Demand** — None of the lessons address content and concepts specific to demand response or demand reduction.
- **Green Careers** — One primary and one secondary unit (33%) address awareness, knowledge, and appreciation (and pursuit) of green careers. The materials do a good job of describing personal and social benefits associated with green careers, presenting "real life" role models, and providing information related to what is involved in pursuing such careers.

Support of Standards

Based on the mapping between lessons and Content Standards provided in the Green Schools materials, there are linkages to a variety of appropriate subject/content areas specified in the Content Standards.

However, it should be noted that the Content Standards are performance based (reflect measureable, observable objectives) and the Green Schools lesson objectives typically are not. Therefore, the actual linkages to the Content Standards may be argued to be significantly lower than is show in the table below.

It also is worth noting that the electronic files provided for the ID team's review did not include the mapping of lessons to the Content Standards. However, we recalled seeing them during the teacher orientation session we observed, and were able to locate them on the program's web site.

Table 38. Green Schools Units and Subject Areas

Subject Area	Percentage of Units Addressing
Math	67%
Science	67%
Sociology	33%
Biology	33%
Language Arts	33%
Other	0%

The materials do a relatively poor job relative to EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria for Science, although they do provide explicit instruction in science vocabulary and employ proper grammar and spelling.

Assessments

There neither formative nor summative evaluation instruments included in the materials.

GREEN CAMPUS

DETAILED FINDINGS

This section presents our detailed findings from 18 in-depth interviews with Green Campus interns in February and March 2012 and an observation of the annual intern summit in January 2012.

Program Design

The key change that Green Campus has made during the 2010-2012 cycle is the development of more formalized success metrics for its interns. Green Campus has developed four "pillars" of focus for their interns: academic infusion, outreach, energy savings, and green career development. Each campus's team of interns must develop projects that support each of these four pillars. Individual interns, however, may personally focus on projects that address one or two pillars.

Based on these pillars, the program developed key performance indicators (KPIs) for interns to meet over the course of the year.

Table 39. Green Campus KPIs by Pillar

Pillar	KPI (2012)
Energy Savings	Average 80,000 kWh savings per campus per year
Outreach	Engage 1,000 students per semester/quarter through outreach and educational activities (note this number can also cross over with academic infusion and green career development activities)
	Develop and implement at least one unique event tailored for students per school semester/quarter
	Distribute nine newsletters promoting energy efficiency topics per year
Academic Infusion	Work with at least 1 faculty member on each campus to devise ways to infuse energy efficiency into the curriculum
	Convene faculty members from each campus to focus specifically on integrating energy efficiency into academic courses
Green Career Development	Host one career event per school semester and a career event at both the mid-year and end-of-year meetings

The program is moving in the right direction in the implementation of these four pillars, and these pillars are guiding the projects that the interns carry out. All 18 interviewed interns said they are aware of and are following the four pillars in their projects, and that they felt that these pillars strongly inform the work that they do.

Interns' projects all fall under one or more of these pillars. Interns tend to individually focus on one project or pillar, while other interns focus on other projects under the other pillars.

However, some of the KPIs may be inappropriate for some campuses or cause interns to focus on less important areas of the program.

One issue is that KPIs are flat across all campuses. This may reduce program effectiveness at some campuses because the goals are nearly impossible for them. For example, Table 40 shows the outreach KPI as a percentage of the student body. For outreach, the Green Campus KPI for all campuses is reaching 1,000 students per term (defined as either a semester or a quarter, depending on the campus) through on-campus events or campaigns. This can include a wide variety of events such as tabling, demonstrations, energy challenges, or classroom activities. Regardless of activity type, all campuses must reach 1,000 students.

The largest schools have five to ten times the student population of the smallest schools, meaning that these large schools have a much wider pool of potential students to reach through multiple venues. The small schools, however, have a much smaller pool and are therefore less likely to get the level of student turnout that is possible at large schools. It is also much easier for smaller schools to oversaturate their messaging by repeatedly reaching out to the same students.

Furthermore, the nebulous definition of “term” as either a quarter or semester means that schools on a quarter system must reach 50% more students per year, further creating a burden for those participating schools.

Table 40 shows the breakdown of outreach KPIs by school. At the University of California, San Francisco (UCSF), which has 2,998 students and is on a quarter system, the annual outreach goal is the entire student population (100%). By contrast, at California State University (CSU) Fullerton, which has 36,156 students and is on a semester system, the annual outreach goal is only 6% of the total student population.

Table 40. Outreach Goal (1,000 Students Per Term) as a Percentage of Student Body by Campus

Participating University Name	Quarter or Semester?	Total Outreach Goal Per Academic Year	Student Body Size [a]	Outreach Goal as % of the Student Body
University of California, San Francisco	Quarter	3000	2,998	100%
University of California, Merced	Semester	2000	5,198	38%
Humboldt State University	Semester	2000	7,773	26%
University of California, Santa Cruz	Quarter	3000	15,825	19%
California State University, San Bernardino	Quarter	3000	17,250	17%
California Polytechnic Institute, San Luis Obispo	Quarter	3000	18,762	16%
California Polytechnic Institute, Pomona	Quarter	3000	22,273	13%
University of California, Santa Barbara	Quarter	3000	22,850	13%
California State University, Chico	Semester	2000	15,920	13%
University of California, Irvine	Quarter	3000	27,676	11%
California State University, Long Beach	Semester	2000	34,870	6%
University of California, Berkeley	Semester	2000	35,843	6%
California State University, Fullerton	Semester	2000	36,156	6%

[a] Source: Count of total student population (graduate and undergraduate) provided on university websites.

Furthermore, the focus of the KPIs may not be promoting WE&T goals effectively. While WE&T emphasizes energy efficiency education and workforce training, only two of the interviewed interns said that green career development was a priority for their teams in the 2011-2012 school year.

This ties back to the strictness of the KPIs: students are required only to hold one "event" in green careers per semester, while they must meet precise requirements for energy savings (80,000 kWh/year) and outreach (1,000 students reached). One intern pointed out that these numbers require "more effort to reach," while another said that they are "tethered to the metrics." Therefore, it is easier to give lower priority to the less quantitatively strict requirements of academic infusion and green careers.

Intern and Campus Reach

The program is focused on developing both the interns and the campus, though the interns get the most depth of development. The interns interact with Green Campus permanent staff, are trained on Green Campus topics, and develop and implement the program's energy efficiency projects, so the program impacts them the most directly and deeply. However, the program also strongly emphasizes indirect impacts to the campus via the intern projects.

Per the Q2 2011 quarterly report, the program reported having 65 total paid interns, with the number varying from four to six for each campus. Across the 13 participating campuses covered in this evaluation, these interns reached roughly 20,000-25,000 students through direct outreach

efforts (such as in-person contacts and events) and 145,000 students through indirect outreach efforts (such as marketing efforts and website hits) in the 2010-2011 year.[25]

The four pillars of the intern goals are all externally focused, and the program heavily emphasizes that interns should work with on-campus stakeholders to develop their on-campus projects. In fact, the program offers specialized training on how to work most effectively with program stakeholders, teaching interns how to develop and maintain relationships with high-level campus contacts, including faculty, administrative staff, and facilities management.

However, program interns do not only work with campus staff, but due to the outreach requirement, must also spread energy efficiency topics to other students.

Program Value

The Green Campus program is unique in both the topics it focuses on in its campus projects and in the depth of experience it provides its participating interns.

When asked to rate how much they learned about energy efficiency that they would not have learned otherwise, interviewed Green Campus interns gave a mean rating of a 6.0 (out of 7). These interns praised the real-world experience that the program gave them in learning how to implement energy efficiency projects, as well as hands-on training on conducting audits and the measures that improve energy efficiency.

Interns especially cited the Green Campus program for giving them on-the-job training that could apply to their actual careers. One said that the "real-world experience about energy efficiency" gained through Green Campus would give him the "edge" in his post-graduate job placement.

Furthermore, some students said that Green Campus prompted them to search into further energy efficiency and sustainability topics and technologies on their own. Students who were interested in technical and engineering aspects of energy efficiency in particular said that they pursued their own studies in this area.

The Green Campus program is also unique to the extent that it engages campus faculty and staff in the development of its campus projects. Faculty and facility stakeholders are key to the success of the programs on campus, and the program trains its interns in how to effectively develop and leverage these relationships to promote energy efficiency on campus. Interns are regularly in contact with high-level decision-makers on campus, giving them a unique role in campus decision-making regarding energy efficiency.

All but one of the Green Campus interns interviewed said that they felt the programs fit in well with the existing efforts on their campuses. Interns on some campuses were able to work with other environmental clubs and organizations, though other interns said they were having difficulty developing those relationships on their campuses. The one intern who said the program did not fit in well said that the program did not fit as well into the campus culture at their school, and that it was difficult to engage students on energy efficiency topics.

Green Campus programs varied from school to school in the amount of interaction they had with other similar campus programs. One intern said that they were the only organization on their campus

[25] These figures are extrapolated from the Green Campus reported mean outreach per campus per term reported in its 2010, Q1 2011, and Q2 2011 reports and should not be considered exact figures.

that covered any environmental topics. Most interns said that they were one of several environmental organizations, but only one said that another organization on campus also addressed energy and energy efficiency topics.

Campuses with multiple environmental organizations said that they worked to cooperate with these organizations, and that they usually did not duplicate each others' goals or efforts. Campuses with many environmental organizations said that they were regularly in contact with these other organizations and worked collaboratively on some campus events. For example, one intern described multiple environmental organizations on campus collaborating on a campus green career fair.

Green Career Awareness

The program is strongly promoting green career awareness among its interns, but has room to grow in its reach among the wider campuses.

In essence, the program trains its interns to become program implementers. Interns design projects on energy efficiency topics, develop relationships with stakeholders, manage budgets, and carry out these projects almost entirely on their own.

The program builds interns' awareness of energy efficiency and sustainability topics in ways that can apply to their career development. In interviews, interns most often mentioned skills developed in four key areas: technical aspects of energy efficiency, equipment and software, management, and business communication. Energy efficiency topics included knowledge about energy efficient measures and practices, such as HVAC and lighting. Equipment and software training particularly included Excel training, as well as training on audit software. Management skills mentioned included time management, team-building and motivation, and budgeting. Communication skills mentioned included stakeholder communication and professional etiquette, grant writing, intra-team dynamics and coordination, public speaking, and following up to report results.

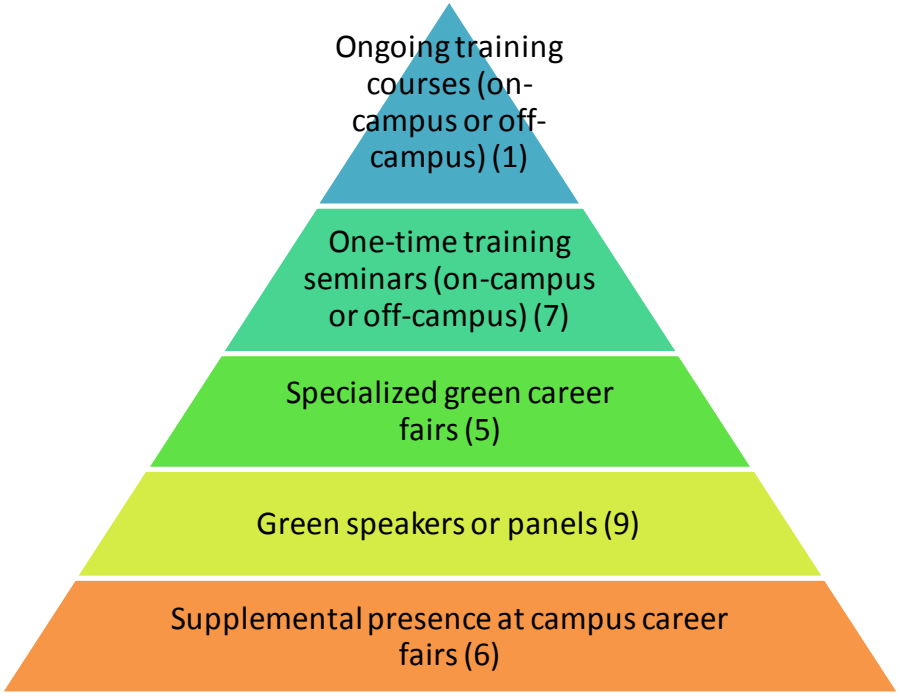
One intern summarized the skills developed: *"Self determination, proactivity, taking ownership of a project and following it through. Nobody tells you what to do - you create it."*

Furthermore, many interns said that the Green Campus program has influenced their plans for their post-college careers and helped train them for the careers they want. Interns gave the program a mean rating of 5.4 (on a 1-7 scale) for influencing their decision to go into their chosen professional field post-college.

However, the campus-wide program has generally not gone into depth on providing wider green career development. Students are required to have one event per term that falls under the "green career outreach" pillar, but not all green career outreach events provide the same depth of information.

Green career events suggested to students include identifying green businesses at campus-wide career fairs, hosting specialized green career fairs, inviting green career speakers to campuses, or offering specialized training courses (either independently or in connection with other organizations). These suggestions vary in terms of depth of engagement for students, as well as degree of difficulty for Green Campus interns. Figure 13 shows the levels of engagement and number of mentions of key Green Campus green career activities.

Figure 13. Levels of WE&T Engagement in Top Green Campus Career Activities (with Number of Mentions in Interviews)



Most interviewed interns said that their green career development activities included either supplemental "green" presence at campus career fairs, panel speakers, or green career fairs. Other activities mentioned included off-campus visits, training series on energy efficiency topics, and one-time seminars or training sessions on career skills such as audits, resume writing, or grant writing.

One level of green career outreach that the program may want to discourage is the possible supplemental presence at existing career fairs. Students at these fairs are less interested in narrowing their interests to green careers only, according to our interviews, and visiting companies do not wish to be identified as not "green." One campus, for example, created a survey for both students and companies attending a career fair on their campus to gauge their interest in green jobs and to match green students with green companies. However, very few students took the survey, and nearly all attending companies qualified as a "green" company.

To move the Green Campus toward a more WE&T focus, interns could instead increase their focus on specialized green career fairs. Specialized career fairs that specifically target students looking for energy efficiency are also common, but more effective at getting a higher number of interested students, according to our interviews.

Program Satisfaction

Interns have a high level of satisfaction with the program overall, with a mean score of 5.9 (on a 1-7 scale) from the 18 interviewed interns, and only one intern giving a score below a 5 (and one other rating the program a "4 or 5").

Interviewed interns also said that they generally have enough resources to do the projects that they want to do on campus. The Green Campus program directly funds the salaries of the program interns, and also provides a $3500 annual implementation budget for each campus for activities and

related materials. It also teaches interns how to apply for grants for energy efficiency projects it plans to carry out on campus. Green Campus interns frequently mention grants as a source of funding for their energy retrofit projects. Several participating campuses have independent funding sources called The Green Initiative Fund (TGIF), which interns also leverage for implementing Green Campus projects. Interviewed interns did not indicate that getting these grants took up a significant share of their time.

Table 41. Green Campus Intern Mean Program Ratings on Key Metrics

Program Measure	Mean Rating (1-7)
Satisfaction with program overall	5.9
Effectiveness of Green Campus in saving energy on campus	6.2
How much intern learned about energy efficiency	6.0
Effectiveness of academic infusion activities in educating others	5.5
Influence of Green Campus on choice of career field	5.4
Effectiveness of outreach activities in educating others	5.1

Implementation

Program implementation is generally consistent with program design. Interviewed interns said that they understood the pillars of the program and that the pillars and the KPIs are the driving force behind the projects that they develop.

Green Campus also provides guidance to program interns in the form of Campus Leads, who are full-time Green Campus staff assigned to mentor each campus, and training materials, such as project "menus" and best practices that highlight successful project types that have been implemented on other campuses.

However, most projects generally do not deviate from these project menus, indicating that while students are handling implementation, they are not taking the lead in design as the program encourages.

Furthermore, some students are struggling to meet their required KPIs; this is likely because some KPIs put a disproportionately heavy burden on some campuses.

Academic infusion had the widest variations in implementation as described in our intern interviews. Academic infusion programs have included creating for-credit Green Campus internships, extracurricular student-led classes on energy efficiency topics, classroom presentations, extra-credit assignments, and infusions of energy efficiency topics into existing classes.

The Green Campus program has also taken on a high-level role in coordinating academic infusion across campuses, bringing in Green Campus faculty stakeholders from all participating campuses for an ongoing cross-campus planning of academic infusion strategies at a high level. This strategy planning is ongoing, but aims to develop a standard of energy efficiency teaching that will apply at all participating Green Campus universities.

Participation

The Green Campus program is designed to directly target its campus interns, and through those campus interns target both students and staff at participating university campuses. The four pillars

of intern goals target these two groups about equally, with greater emphasis placed on student participation for some projects and campus stakeholder participation for others.

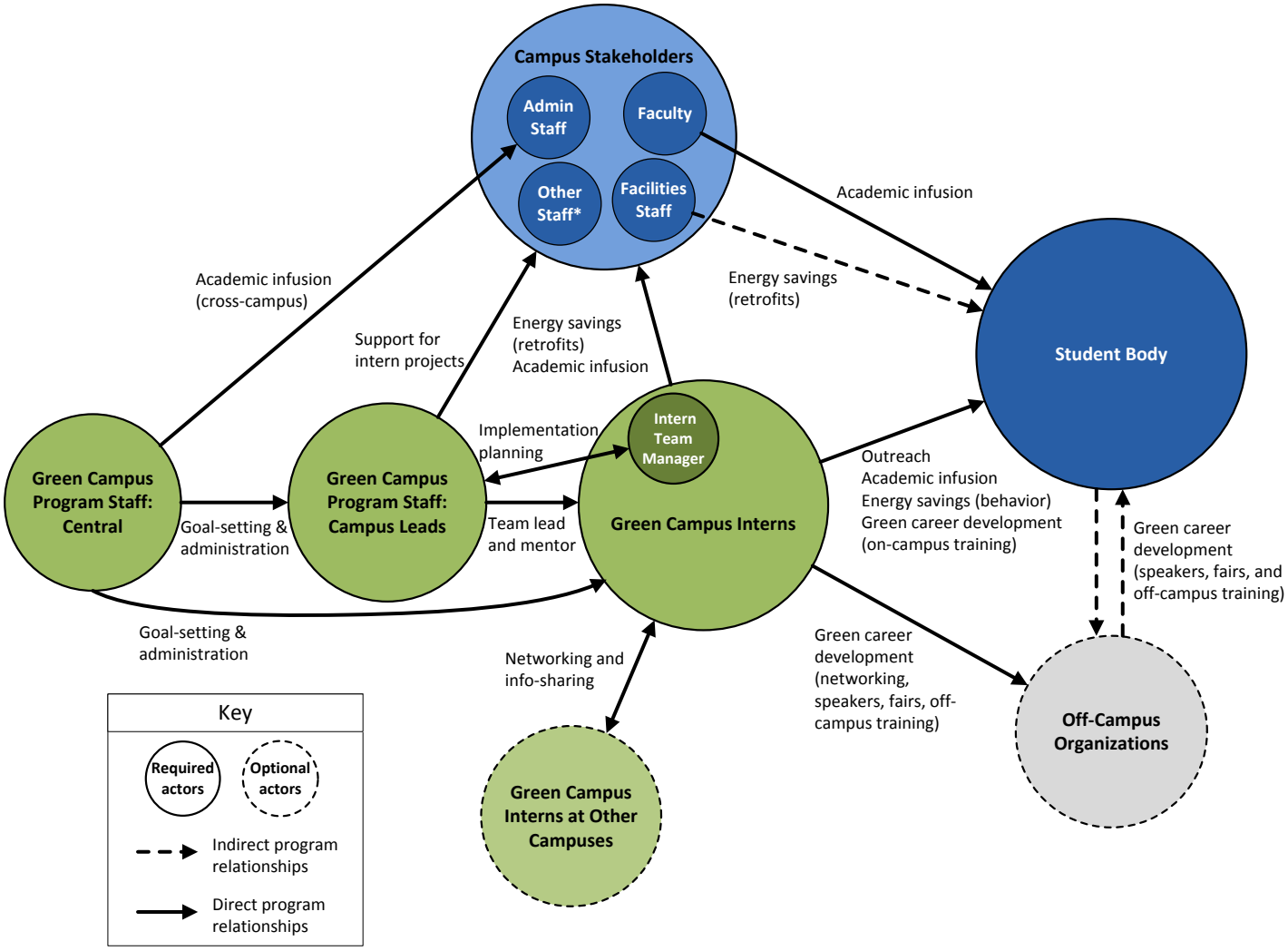
We also found that interns pursue two types of energy savings projects: behavioral projects and retrofit projects. Behavioral projects include energy competitions between residence halls or laboratories, or savings challenges such as campaigns to turn off lights or shutting sashes of laboratory fume hoods. Green Campus interns primarily target the student body for these projects, and often combine these behavioral projects with campus-wide outreach projects. Retrofit projects include installation of energy efficient measures, such as lighting and food service equipment. To conduct these projects, Green Campus interns primarily work with facilities staff on the college campuses.

Figure 14 illustrates the relationships between the different actors and targets of the Green Campus program. Our interviews found that all participating interns targeted both campus stakeholders and the larger student body. Some also work with off-campus organizations and businesses. Green Campus interns also sometimes are in contact with Green Campus at other campuses, though we found that this usually only happens at special events.

Internally, Green Campus interns and staff plan for projects under the four pillars, while program staff helps in the high-level program administration. In addition to the Campus Lead, who offers both mentorship and coordination with the central Green Campus staff, Green Campus teams include an Intern who serves as the Team Manager. The Team Manager works with the Campus Lead in planning implementation on campus and in leading and mentoring intern staff.

Green Campus interns lead the implementation of these plans on their campuses. In our analysis of the intern interviews, we found that interns most often work with campus stakeholders for academic infusion and energy savings retrofit projects. Outreach, green career development, and behavioral energy savings projects primarily target the student body, while energy savings retrofit projects and academic infusion projects target campus stakeholders directly and students indirectly.

Figure 14. Illustration of Green Campus Internal and External Relationships



*"Other staff" includes staff not part of facilities or administrative staff targeted for both savings and outreach activities. These groups include Housing, Dining, Environmental Health & Safety, Research labs and departments, sustainability offices, and associated students.

However, interns vary in the success that they have reaching these audiences by campus, particularly with reaching faculty and staff stakeholders. Some interns said that they have strong, long-standing relationships with their campus stakeholders, and that these stakeholders are key in helping them implement their plans most effectively, especially in academic infusion and energy savings projects.

Furthermore, the types of projects available vary from school to school. Campuses have varying levels of enthusiasm for energy efficiency, and students at both ends of the spectrum may struggle to make an impact with Green Campus. Students at schools where interest in energy efficiency is low have difficulty getting widespread buy-in to the concepts; students at schools that focus on energy efficiency (such as campuses participating in LEED) have difficulty finding projects that have not already been done.

Program Barriers

We have already discussed some of the barriers to implementation in the preceding sections. One key barrier to success is that the program's success on campus is almost entirely dependent on the success of the participating interns. Therefore, the barriers that affect the interns are most likely to be the greatest barriers to program success on campus. To be successful, we found that interns must have the following:

- Projects that account for differing levels of technical and background knowledge on energy efficiency. Some interviewed students said that they lacked technical training or had not taken engineering and math classes, and had trouble understanding the technical information about energy efficiency.
- Cooperative relationships with campus stakeholders, particularly facilities and physical plant staff. This is particularly important to campus retrofit projects and development of classroom-based academic infusion projects. Furthermore, having strong relationships with campus stakeholders can help the program build credibility among the student body. However, interviewed interns who said that they did not have strong relationships with their facilities staff, were most likely to say that they were struggling to meet their goals on campus. Some interviewed interns said that they had difficulty implementing recommendations due to difficulty working with facilities staff. One said that the staff "did not prioritize" energy efficiency, while another said that facilities staff did not want to give the retrofit work to students. Other interns mentioned having the opposite problem: Because their campus was already participating in major energy efficiency efforts such as LEED certification, there were few opportunities left for the interns to develop new projects.
- Interest in energy efficiency among the student body. A few interviewed interns mentioned that they had difficulty engaging students at their campuses in outreach events. One said that students were *"not responsive to the energy reduction concept,"* but that these students in particular are *"economically challenged," "conservative,"* and *"unreceptive*." This is a particularly strong barrier at universities with a large percentage of students who commute or live off campus.

Note that these barriers are addressed on several campuses, but not all. These issues are key dividing lines between the campuses that have been most successful in meeting their goals and those that have been least successful.

Program Activities

We have found enormous variety in projects by campus. Among the interns we interviewed and campus projects we examined, no two campuses implemented the program in exactly the same way. All activities discussed fell into one of the four pillars, although some fell under multiple pillars. The most common activities mentioned of each type are shown in Figure 15.

Figure 15. Top Activity Types across Campuses Per Pillar (Multiple Response)

Depth and Breadth of Activities

Because there is so much variation in the types of projects that Green Campus interns carry out, these projects often vary in terms of depth and breadth from campus to campus and project to project.

Energy retrofit projects were one of the most commonly mentioned projects in our interviews: 12 of 18 interviewed interns mentioned that they were doing a retrofit project as part of Green Campus, and one additional intern said that they had proposed a retrofit project. However, these projects included several types of retrofits: lighting upgrades (6 mentions), delamping projects (4 mentions), installation of occupancy sensors (3), replacement of power strips (3), replacement of shower heads (2), replacement of fume hoods in labs (1), and vending machine upgrades (1).

Interns also frequently mentioned conducting energy audit projects (7 mentions). Interns at several campuses mentioned that they conducted energy audits of campus buildings to identify ways to save energy. Some of these audits look at equipment such as lighting, while others target behaviors such as printer use. One campus said they implement the audits as a competitive system, with buildings receiving ratings for energy efficiency with similar titles to LEED (Platinum, Gold, etc.).

Although the campuses only have a few paid interns, some campuses are also using volunteers and for-credit internships to increase their direct program reach. Six interviewed interns said that they offer for-credit internships on their campuses. One interviewed intern said that their campus held an event early in the year to draw a pool of volunteers that they could call on for help with events. These volunteers and for-credit interns are delegated tasks from the paid interns, and often play a role in larger Green Campus projects.

The program is also in touch with campuses at a high level to explore cross-cutting academic infusion strategies. In this activity, the Green Campus program staff (not the program interns) have gathered high-level stakeholders from across the participating campuses both in and outside of California.

Among the campuses targeted in this evaluation, these stakeholders include CSU Chico, CSU Long Beach, CSU San Bernardino, Humboldt State, Cal Poly SLO, UC Berkeley, UC Merced, UC Santa Barbara, and UC Santa Cruz, as well as representatives of CSU and UC at the systemwide level.

This activity is still in its very early phases, but as of May 2012 has included a kickoff meeting and follow-up discussions on key topics to address. If this effort is successful, it may lead to significant changes in the implementation of energy efficiency topics at the college level statewide. This will be an important area to follow up on in evaluations in the 2013-2014 cycle.

Outreach

The "Outreach" pillar also easily crosses over to the other pillars, and has the greatest variety of project types mentioned.

The outreach events vary not only in depth, but also in specificity of messaging. Messaging mentioned by interns varied from energy efficiency generally, pledge signing, and demonstrations of energy usage and savings, to promotion of specific events such as energy competitions.

Outreach projects mentioned multiple times in our interviews included tabling events (8 mentions), energy competitions (5), pledge drives (5), student orientation events (3), bike blender demonstrations (3), item giveaways (3), newsletters (2), energy saving challenges (2), academic infusion events (2), and parties/food (2). Many outreach events were only mentioned once: green career fairs, photo booths (to support pledge drives), sample energy bills, energy efficiency quiz nights, speakers on sustainability topics, online promotions, and promotion of retrofit activities. One campus also created an energy efficiency spokesperson and rapper, "Mr. Eco," to promote the program around campus and at campus events. This indicates that interns are most likely to be thinking about additional methods of outreach to fit the culture of their individual campuses.

The success of the same outreach types of events may also vary by campus. Energy savings competitions, for example, mentioned as both savings and outreach projects and a popular project to implement, were implemented at different schools with very different results. Three interns mentioned that the energy savings competitions were their most successful event of the year – one saying that energy competitions get *"good results"* and *"promote the Green Campus brand."* Two other interns, however, listed energy savings competitions as their *least* successful event of the year: One said that *"energy competitions do not do well [at this campus]"* and that the student population is *"not into competitions."*

Interns gave the lowest mean rating (5.1 out of 7) to the effectiveness of the outreach pillar in promoting energy efficiency awareness on campus. Students also had the widest range in responses to this question, with responses ranging from 1 to 7. Most interviewed interns gave the outreach a rating of 6.

Other students said that students may attend an event or sign a pledge but not be engaged any further in energy efficiency. These students expressed that they would like to include more in-depth outreach with more long-term effects into their outreach activities.

Program Support

All interviewed interns said that they received training from the Green Campus program. Sixteen of eighteen agreed that the training they received prepared them for what they experienced as a Green Campus intern. Training topics mentioned most often included the Green Campus program

requirements, software skills (especially Excel), outreach and communication strategies, and energy efficiency topics such as measures and saving strategies.

Many interviewed interns mentioned that the annual statewide summit was one of the most valuable training events. The statewide summit is held in late January, and brings student representatives from all participating campuses to one location for a four-day session. Interns are divided up into sessions that offer specialized training for new interns, returning interns, and graduating interns. Interns also present posters and give talks about selected projects that their team has conducted in the last year.

Several interviewed interns said that when they first started at the program, they did not feel that they had been fully trained until they attended the statewide summit. Furthermore, some interns mentioned that the statewide summit was one of the only opportunities they had to network and share strategies with interns at other campuses. However, some returning interns said that the summits grew less valuable over time and that they felt that they were "*repetitive*" in content.

All students trained on audits, but several do not have use for them. Others wanted more in-depth technical training, and some interns wanted more in-depth technical training and development. However, other interns said that they did not have the technical background needed for the program before they joined. Older interns sometimes said they felt *"less challenged"* over time and that projects could become *"repetitive."*

Our interviewed interns said that while they are receiving training from Green Campus, they are primarily learning from and training each other. One intern said that though the training prepared them, it was "just an orientation" and that they "learned on the job as projects evolved." This intern said that they preferred the training be carried out this way, but the training may be less effective if the intern giving the training is not invested. One said that they worked with an intern mentor who was about to graduate and was not invested in the program. This mentor passed on their projects to the new intern, but was not willing to provide the new intern with guidance.

Interns also said that they are supported by their Campus Leads. Campus Leads are full-time Green Campus representatives who lead and mentor the student intern teams, helping them develop and track their projects and goals. They also serve as the primary liaisons between the Green Campus interns and the central Green Campus program, as well as offer support to Green Campus interns in working with campus stakeholders.

Because they serve not only as mentors and program liaisons but also as institutional memory, Campus Leads also play a key role in providing ongoing support to Green Campus interns. Several interviewed interns mentioned that their Campus Leads were key to helping guide them through the day-to-day issues.

However, because of the significant role the Campus Leads play, any ways that they struggle impact the entire campus team. A poor relationship with the Campus Lead can impact interns' overall experiences with the program. The only interviewed intern who gave a low overall satisfaction score (3) to the program, said that they gave this score because they had a weak Campus Lead. (The intern noted that this Campus Lead has recently been replaced and that the new Campus Lead is *"much better."*) Two interviewed interns mentioned that their Campus Leads had been replaced recently – one said they had changed Leads multiple times – and that they needed some time to adjust to orienting the new person to the program.

Many interns say that their Campus Leads provide important support and mentorship. Half of the interviewed interns said that they felt they had strongly positive relationships with their Campus Leads. These interns especially turned to the Campus Leads for support and advice on project

management issues, such as meeting deadlines, finding resources for projects, and managing relationships with stakeholders.

Several others said that their relationships with the leads were more neutral, but they still felt that they had enough support due to support they received from other interns. These interns said that the leadership vacuum was filled by others: two mentioned that they primarily relied on other Green Campus interns, while another mentioned that they worked more with their primary campus stakeholder contact rather than the Green Campus program staffer. Either way, interns need some kind of leadership to be most successful. Ideally, this is provided by the Campus Lead, but if not, it is provided by other interns.

Other key support for the interns comes from the four pillars themselves. All interviewed interns said that these pillars provide guidance for the interns in developing their campus projects. These pillars provide structure to the interns' planning and help them develop more targeted goals. The program also offers a "Project Menu" during orientation. This Project Menu offers a list of example projects and best practices that address each of the four pillars. Many of the projects described in our interviews are drawn from this menu, indicating that the Project Menu is a key guide for interns in developing their project ideas. Table 42 shows the list of projects from the Project Menu, and how many interns mentioned implementing these projects on their campuses.

Table 42. Projects Drawn from the Project Menus by Pillar

Pillar	Project Type	Number of Intern Mentions [a]
Academic Infusion	For-credit internships	6
	Peer-to-peer teaching (in-class presentations)	8
	Coordinating campus-wide curricular infusion	0 [b]
Energy Savings	Laboratory fume hood campaign	1
	Energy or water reduction competitions	7
	Lighting retrofits	8
	Network-based power management (EMS systems)	0
	Dining facility retrofits	1
	Energy audits of campus buildings	5
Green Career Development	Specialized job fairs	5
	Energy efficiency training seminars	5
	Career panels/speakers	9
	Link students to job shadow opportunities and community resources	2
Outreach	Outreach campaigns	9
	Web-based campaigns and pledges	1
	Community (off-campus) outreach	2
	Exploration of rebate opportunities	0

[a] Note that some interviewed interns classified these projects under a different pillar from the one assigned in the Project Menu.

[b] Some interns have integrated energy efficiency concepts into individual course syllabi, but none reported working on academic infusion at a campus-wide level as described in the Project Menu. These activities have instead been taken on by the central Green Campus staff.

Many interns are also developing projects independently of the menu, particularly in the outreach pillar. These independent projects include extracurricular classes and seminars, energy demonstrations, lighting and water loggers, orientation events, parties and quiz nights, and direct installation projects such as power strips and shower heads.

Because of the wide variety of project types, the program attracts a wide variety of students with a range of training needs. Some students may focus on marketing and communications, while others focus on technical challenges of installing energy efficient measures. Thus, the current training methods overall likely provide enough program support.

DEVELOPING ENERGY EFFICIENCY PROFESSIONALS PROGRAM

Program Description

DEEP is an entirely new program that planned to start implementation at community colleges in the fall of 2011. DEEP is an employment development program designed to train and educate community college students in the areas of energy efficiency and demand side reduction. The program plans to achieve this through classroom learning (infusing sustainability into existing classes and curriculum), projects, and outreach within the campus community. Along with preparing students for green careers, the program also aims to reduce operational costs for the participating community college campuses by promoting the understanding of demand response, resource conservation, and carbon emission reduction.

Program Design

Development and design of the DEEP program first started in early 2011, primarily in response to California's strategic plan and the need for a specific program that would address the unique characteristics of community college students.

Being an entirely new program, a program theory logic model has not yet been developed, but the DEEP program website lists the program's primary goals as:

- Promote sustainability and efficiency awareness
- Hands-on learning opportunities
- Green workforce exposure and real-world experience

In addition, one of the primary goals of the program is to provide energy efficiency and sustainability curriculum development assistance to faculty members with the ultimate goal of developing two-year degrees and certificate programs in sustainability and efficiency.

Community college students are almost all commuter students (not staying in dorms or nearby housing) and are pursuing two-year degrees or certificates in their field of study (versus a bachelor's degree at four-year institutions). These two characteristics alone make community college students very different from four-year college and university students, with noticeably different needs, goals, schedules, and priorities.

DEEP will be piloted at three community college campuses, Citrus Community College, Mt. San Antonio College, and El Camino College, starting in the fall of 2011.

In an effort to address every potential sustainability aspect at a community college through the pilot program, including curriculum development, hands-on training and work experience, and reduction in campus operational costs, DEEP has taken a different approach to implementing the program at each of the three pilot campuses. Specifically, DEEP has been working with a different section of

each college's faculty and staff to design and implement the same program at each school. At Citrus Community College, program development has been conducted with faculty members, the Vice President of administration, and business operations managers, while development at Mt. San Antonio College has primarily gone through the facilities director, and at El Camino College primarily through career technical education. In theory, the basic structure of the three programs will be the same regardless of campus, but how the program is initially implemented at each campus will have been achieved through different methods.

The following table outlines the differences in the three approaches, specific goals and outcomes expected through each different method, and ultimately how each contributes to the establishment of a holistic program that can be implemented at community college campuses throughout California.

Table 43. Differing DEEP Implementation Strategies

Pilot Program	DEEP Approach (who DEEP is working with to develop program)	Goal of Specific Approach	Anticipated Result
Citrus Community College, Glendora	Faculty members, VP of Administration, and Business Operations Managers	Develop the sustainability template which will be rolled out to the rest of the campuses	An employment development program that will train and educate community college students in the areas of energy efficiency, provide hands on experience, and reduce operational costs at participating campuses.
Mt. San Antonio College, Walnut	Facilities director	Minimize use of energy on the campus	
El Camino College, Torrance	Career technical education	Partner with businesses to create certificate courses and industry connections	

At Citrus, DEEP is specifically working with the Dean of Environmental Sciences to infuse science, engineering, and mathematics courses initially with the principles of sustainability and energy efficiency, while working with the Science, Technology, Engineering, and Mathematics (STEM) programs. In addition to working with other faculty and administration, this approach is intended to allow DEEP to further develop a template, specifically in regards to how sustainability can be infused into existing classes, and eventually a more standalone curriculum that can then be replicated at other campuses.

Program Participation

Starting in the fall 2011, a "sustainability primer" will be taught by the program director on each of the three pilot campuses. The goal of the primer is to reach students who have little or no exposure to sustainability and help them understand what sustainability is, how it can impact them as individuals, and what they can do in their own personal lives to generate savings. The primer will

focus on core aspects of sustainability and efficiency such as energy, water, transportation, food, community, and the built environment.

Faculty will later leverage the items used in and created from the program, such as student research and case studies, to develop curriculum for two-year associate's degrees and certificate programs. Overall, the primer and student participation will create the initial linkages necessary to build awareness and the impetus to create a two-year degree.

Strategic Alignment

The DEEP program was created in response to the California Strategic Plan and Needs Assessment and so has been designed from its inception to align with the plan. While sustainability has taken a deep rooting in the higher education sector in California, particularly in the UC and CSU systems, California community colleges have not experienced the same impact. Therefore, the plan identified community colleges as a missing piece in establishing sustainability in the overall education system in California.

The concept of DEEP resulted as a way to meet the unique needs of community college students with a program that would ultimately help faculty incorporate principles of sustainability and energy efficiency into the existing courses and create new curriculum and certificate programs while also emphasizing career development and campus sustainability.

Career Development and Further Outreach

One of the key focuses of the DEEP program and implementing a program specifically at community colleges is for the purpose of career awareness, exploration, and development for students. As already discussed, DEEP plans to work closely with career development and technical education departments at community college campuses to achieve this, and also plans to work closely with SCE and private sector companies as well as the SCE Customer Technology Application Center (CTAC) for students to gain work experience. Participants will work with stakeholders and organizations on campus to create and implement efficiency projects and conduct outreach events and activities, while developing relationships for future career growth.

Program Tracking

Still in its initial start-up phase, DEEP does not currently have an established method of tracking program participants or progress. However, since early 2011 when the program was first being designed, the program director has tracked a variety of measures including:

- All contacts at participating campuses as well as students recommended by faculty members
- Programs and classes at each campus into which faculty/staff would like to incorporate sustainability principles
- Available resources nationwide and internationally that could contribute to program development
- Lists of actions that will be taken at each campus for the start of the school year

The program administrator does plan to track participation data as the program gets off the ground and evolves throughout the school year. Tracking tools would include items such as names and contact information of students, faculty, staff, professionals, and community members that become

involved with any portion of the program. In addition, any activities and events that the program participants conduct or attend, attendance figures at events, projects, case studies, peer-to-peer mentoring, and any additional community or campus outreach done through the program would be documented.

GREEN PATHWAYS

The Evaluation Team first met with the Green Pathways team to understand the pilot program it was developing in July of 2011. Below we describe the program's design and characteristics at that early stage of development.

Program Description

Green Pathways is an online social networking community aimed mostly at high school and college students interested in careers in environment/sustainability. It is open to the public, and energy/sustainability professionals are specifically encouraged to join. The community advertises its ability to put students in contact with professionals in fields of interest, and help students build their professional networks as well as identify possible career paths. The site offers discussion forums centered on both environmental/sustainability issues and career issues. The site is extremely new and is still under development.

Program Participation

As of July 2011, Green Pathways has 27 members, 24 of whom identify as Northern California residents. The pilot program focuses on the greater Bay Area. The site is aimed at high school and college students, but at this point, there has not been enough activity on the site to assess the composition of its audience. Developers have formed development partnerships with Berkeley High School, Benicia High School, and the YMCA/PG&E Teen Center in Berkeley, and are working with classroom teachers to implement Green Pathways as a curricular resource (presumably at the high school level, though not specified in program documents). In particular, program organizers have contacted Advanced Placement (AP) environmental science teachers.

Green Pathways developers have made some efforts to target low-income and minority groups by reaching out to schools and organizations that serve disadvantaged youth. Program developers note that in the first year, most of the schools they worked with (focus groups, etc.) were Title I schools. They have also partnered with community organizations such as the YMCA and Boys and Girls Clubs, which often serve disadvantaged students.

Program Design

Participants gain information primarily by interacting with other members on the Green Pathways site. Members can start or contribute to existing discussions, ask questions, or join a group working on a solution to a specific sustainability-related "challenge." The site also publicizes environmental/sustainability events members can attend.

Broadly, Green Pathways' goals are to increase long-term energy efficiency and sustainability efforts across the state by encouraging students to pursue "green" careers. It plans to accomplish this by helping its members (specifically high school and college students):

1. Identify interests and career paths in the environmental and sustainability sectors by fostering discussion among site members about career options.

2. Gain exposure to environmental and sustainability issues, again through online discussion of current issues, and develop "inquiry and research skills."

3. Build a professional network of contacts in these career fields.

In the short-term, the goal of the Green Pathways pilot program is to demonstrate proof-of-concept. Program developers hope in the next three years to achieve "robust interaction…where students are joining in independently…from the classroom to participate in other discussions, to start working with other students from the community."

Anyone can participate in Green Pathways, though it is geared toward high school students. Site membership is limited to people aged 14 and over; prospective members are required to give their age when creating an account. To date, developers have mostly focused on increasing awareness of Green Pathways by recruiting students to help build up the site; they have partnered with local schools to organize student focus groups and recruit interns to work on and publicize the site. They have so far concentrated most of their resources on high school students.

Because Green Pathways is so new, there are no previous program cycles against which to compare this cycle, and the program may undergo changes after more specific assessment and evaluation guidelines are developed.

Strategic Alignment

Green Pathways developers are working with PG&E to determine and improve alignment with the Strategic Plan. Developers have expressed concern that including both college and high school students may create an overly broad audience; they may choose to limit the grade levels they target (probably to high schoolers, as this is where they currently focus most of their resources).

With regard to Connections goals, Green Pathways essentially exists to increase emphasis on career awareness and career exploration. It does so by fostering discussion among students and sustainability professionals about career options, as well as issues relevant to the environment/sustainability field. The program aims to provide career guidance beyond what students currently receive in school.

Green Pathways does not formally coordinate with other WE&T programs at this point, but has begun exploring partnerships with other programs. For example, Green Pathways developers reached out to the Green Campus program to recruit student interns. Though Green Pathways and Green Campus may interest the same student audience, there is little overlap because Green Pathways is a self-contained online community. Green Pathways organizers have also communicated with the green academies, specifically the energy academies. Program organizers hope to supplement the classroom work the academies do, for example, by giving teachers an online hub for hosting projects, or by putting students in touch with experts in subject matter they have encountered in class.

Curriculum

Green Pathways is working with teachers to develop its site as a curricular resource, but has not yet been formally integrated into school curricula. At this point, developers hope the site will serve as a supplement to traditional curricula. For example, teachers could use Green Pathways as a platform for organizing collaborative projects for their students. However, Green Pathways may be limited in its ability to significantly integrate into academic curricula until it demonstrates proof-of-concept. According to developers, more formal academic programs such as Green Schools have expressed interest in partnering with Green Pathways once it has established proof-of-concept. Developers also

face logistical hurdles to integrating Green Pathways into academic curricula. "[Schools] don't have computers in the classroom. They still don't. When we were coming in to do the - to work with the students they had to plan ahead; they had to order the cart with the computers and so we couldn't do it some days because the computers weren't available," program organizers said.

Program Strengths

Green Pathways has successfully launched its site (though it is still under development), and currently has 26 members. There has been some discussion among students and sustainability professionals on the site. Green Pathways has also been successful in forming partnerships with local educators and community organizations, as discussed previously.

Areas of Improvement

At this point, the most significant challenges the Green Pathways program faces are 1) demonstrating proof-of-concept through the pilot program and 2) devising concrete success metrics. Indeed, creating these metrics will be a critical step toward being able to demonstrate proof-of-concept. Because this is the first year the website has been up and running, it is difficult to identify areas where the program needs to improve. However, developers have already identified obstacles such as collecting data; creating tools to do this will help them identify areas for improvement in the future, and so must be a focus of the program in the short term.

Updated 2012 Program Design

The Evaluation Team met with the Green Pathways implementation team in March of 2012. The program had planned to spend the first and second year of its pilot testing ideas with students for this program. During testing, the program realized that some of their initial vision for an open online community similar to Facebook needed to be revised to allow for more structure and outcome measurement.

As such, the program plans to pilot the course in late spring, summer and fall 2012. The course will be a multi-week online course where students will get the chance to interact with peers and "Green Gurus." The course contains seven course modules:

- Module 1. Get Started with Green Pathways
- Module 2. Environmental Sustainability
- Module 3. Career 101
- Module 4. Explore Careers and Connect the Dots
- Module 5. Networking
- Module 6. Informational Interviews
- Module 7. My Green Pathways

The course is designed for students to learn about environmental sustainability and careers, and gives them an opportunity to explore their green career options.

While still under development, the Evaluation Team thinks this program has potential to provide high school students with beginning green education, resources, and connections that will enable them to

explore and find a path toward a green career. The program provides unique value to the market in the following ways:

- It is one of the only IOU high school targeted Connections programs that is leveraging the online environment and social networking trends in education. It is unique in that it is utilizing online learning and communication. By utilizing an online education method, it is has good scalable potential across the state.

- Most of the other Connections programs that reach high school students are geared toward providing supplemental curricular resources and they are more informational or awareness building. The Green Pathways program is both a curricular resource and a workforce development program. Its vision is to integrate career preparation for high school students interested in a green career. It aligns well with the Strategic Plan and Needs Assessment because this program is geared toward workforce development for high school students.

- The program can easily link to and leverage other Connections programs to increase program awareness amongst high school students. The program can also leverage the Energenius Green Career Guide by including an online version of the guide on its website, as this is a great resource for high school students. The Green Schools program could also enhance its green career focus by encouraging the high school students it reaches to participate in the Green Pathways program. It also has the potential to link to the Centergies programs and IOU resources by providing Green Pathways students with access to those experts and potentially providing the education needed to serve as interns and/or employees for the Centers or IOUs. Students in 11th and 12th grade are looking for mentors, internships, and part-time and full-time jobs. Green Pathways can help link these students to mentors and job possibilities. Green Academies and New Academies has a requirement for internships, and Green Pathways can help these students find the internships by connecting them to the right people and giving them the skills they need to search for an internship and build relationships.

- It is challenging to get energy efficiency and green career education into the existing high school curriculum because it is difficult to place it in a specific subject, and high schools are primarily focused on SAT or AP exam preparation. This online program can easily be incorporated into clubs or after-school programs, or be incorporated into the school day during the end of a school year, post SAT and AP exam taking.

- The program has flexibility for teachers to structure it; they can do it as one consolidated or condensed period of time or span it out over a semester or a few weeks.

- Students can use their experience to demonstrate that they have learned something in the area of energy efficiency that can help them get jobs or into schools (e.g., an online profile that shows all the work they have done in the green field). The program is also considering how students can get a certificate after completing the course and potentially how the course can qualify for credit towards community college.

- The building of an online community allows for collaboration and partnerships between educators, students, business, industry, government, and non-profits that can help give high school students information, skills, and resources to find a green career path.

- With the lack of guidance counselors in high schools due to budget cuts, the program can provide online green career coaching for students. It gives students access to green gurus and career coaches to help them explore careers and helps them think through how they can make decisions about what to do after high school.

Finally, the program has developed a comprehensive evaluation plan for its pilot efforts in 2012. It will be interesting to see how the pilot performs in 2012 as it has great potential for serving the market's need for helping high school students gain the knowledge, skills, and resources to begin a path toward a green career.

Appendix B: YARDSTICK CRITERIA AND SCORING METHOD

We used four sets of evaluation criteria, referred to as yardsticks:

A. Learning Effectiveness

B. School/Teacher Support

C. Learning Focus

D. Materials and Equipment (lesson-specific details used to score some higher-level criteria in yardstick B)

The first-level numbered items (1, 2, 3…) under each of these yardsticks on the following pages are the dimensions on which we will evaluate the materials. The second-level items (1.1, 1.2, 1.3…) under each dimension are the specific evaluation criteria.

The yardsticks are consistent with the California Department of Education EEI Instructional Materials Evaluation Criteria. (See note on p. 16 for an explanation of EEI evaluation criteria.)

How the Yardsticks Are Used for Rating Learning Materials

For most criteria, a set of educational materials may score 1 (yes), 0 (no), or "na" (not applicable). Other criteria are scored on a scale, with 1 being the highest rating and 0 being the lowest. The definitions of the ratings used for each criterion is found in the actual yardsticks, beginning on p. 176. If a criterion is not applicable to a given set of materials, that criterion is not considered in the scoring. An overall score in a dimension is determined by actual score divided by the total possible score.

For example, consider the "Lesson Design" dimension of the Learning Effectiveness yardstick. This dimension is composed of four criteria, as shown in table the below. Let's say that in the review of a particular set of materials results in:

- "Yes" on three of these criteria
- "No" on one criterion

That means that materials score 3 (three "yes" answers) out of 4 total possible points on this dimension.

Table 44. Example Scoring for "Lesson Design" Dimension on Learning Effectiveness

Lesson Design	Score
Lesson content directly supports the learning objectives	YES
Lesson content directly supports related activities	YES
The lessons as a whole employ a variety of media/modes (visual, aural, and kinesthetic)	YES
Each lesson includes estimated time frames for completion	NO

Lesson Design	Score
Total Points Scored / Total Possible Points	3/4
Score	75%

As another example, let's say we're applying the Learning Effectiveness yardstick to a different set of program materials. In this situation, the materials do include estimated time frame for completion.

However, there are no learning activities apart from those that are directly incorporated into the lesson. Therefore the criterion on supporting related activities is not applicable. The review of these materials results in:

- "Yes" on three of the criteria
- "Not applicable" (na) on one criterion

That means the course scores 3 (three "yes" answers) out of 3 total possible points because "not applicable" items are not considered in the scoring. Therefore, the materials score 100% on this dimension.

Table 45. Another Example Scoring for "Lesson Design" Dimension of Learning Effectiveness

Lesson Design	Score
Lesson content directly supports the learning objectives	YES
Lesson content directly supports related activities	na
The lessons as a whole employ a variety of media/modes (visual, aural, and kinesthetic)	YES
Each lesson includes estimated time frames for completion	YES
Total Points Scored / Total Possible Points	3/3
Score	100%

A. Learning Effectiveness Yardstick

Dimensions and Criteria	Eval Level	Scoring and Notes
A.1. Objectives		**(see EEI Criteria, Category 2)**
A.1.1. There are learning objectives (clearly stated student goals and outcomes)	Unit	1 = yes 0 = no na = not applicable (e.g., not an instructional unit)
A.1.2. The learning objectives are specific, observable, and measurable	Unit	1.00 = All objectives (100%) 0.75 = Significant majority of objectives (Approx 65%-99%) 0.50 = Moderate number of objectives (Approx 30%-64%) 0.25 = Few of the objectives (Approx 1% - 29%) 0.00 = None of the objectives (0%) na = not applicable
A.1.3. The objective hierarchy is clearly delineated (TPOs and EOs)	Unit	1 = yes 0 = no na = not applicable (e.g., objectives not listed) TPO = terminal performance objectives... the overarching objectives EO = enabling objective... objectives that support a TPO
A.1.4. Objectives correspond with the Content Standards for California Public Schools and the California Environmental Principles and Concepts	Unit	1 = yes 0 = no na = not applicable (e.g., objectives not listed) If they do say this objective supports that content standard, take their word for it... or do a spot check. Don't verify all (or most) objectives.
A.2. Lesson Design		
A.2.1. Lessons' content directly supports the learning objectives	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g. no lessons in unit or no objectives in unit)
A.2.2. Lessons directly support activities	Unit	1 = yes 0 = no na = not applicable (e.g., no activity related to lesson)
A.2.3. Lessons, collectively, employ a variety of media/modes (visual, aural, and kinesthetic)	Unit	1 = yes 0 = no

Dimensions and Criteria	Eval Level	Scoring and Notes
		na = not applicable (e.g., no activity related to lesson)
A.2.4. Lessons include estimated time frames for completion	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29% 0.00 = None of the lessons (0%) na = not applicable (e.g. no lessons in unit or no objectives in unit)
A.3. Activity Design		
A.3.1. Activities directly support the learning objectives	Unit	1.00 = All activities (100%) 0.75 = Significant majority of activities (Approx 65%-99%) 0.50 = Moderate number of activities (Approx 30%-64%) 0.25 = Few activities (Approx 1% - 29%) 0.00 = None of the activities (0%) na = not applicable (e.g., no activities included in unit; no stated learning objectives)
A.3.2. Activities directly support the lessons	Unit	1.00 = All activities (100%) 0.75 = Significant majority of activities (Approx 65%-99%) 0.50 = Moderate number of activities (Approx 30%-64%) 0.25 = Few activities (Approx 1% - 29%) 0.00 = None of the activities (0%) na = not applicable (e.g., no activities included in unit)
A.3.3. Activities use a variety of effective approaches to involving students	Unit	Calc on following subs (A.3.3.1, A.3.3.2, A.3.3.3, A.3.3.4): number with significant majority or all activities having the characteristics / total number of characteristics countif(=>0.75)/count
A.3.3.1. Activities directly involves students in hands-on, learning-by-doing activities	Unit	1.00 = All activities (100%) 0.75 = Significant majority of activities (Approx 65%-99%) 0.50 = Moderate number of activities (Approx 30%-64%) 0.25 = Few activities (Approx 1% - 29%) 0.00 = None of the activities (0%) na = not applicable (e.g., no activities included in unit)
A.3.3.2. Activities enable the learners to discover important information on their own.	Unit	1.00 = All activities (100%) 0.75 = Significant majority of activities (Approx 65%-99%)

Dimensions and Criteria	Eval Level	Scoring and Notes
		0.50 = Moderate number of activities (Approx 30%-64%) 0.25 = Few activities (Approx 1% - 29%) 0.00 = None of the activities (0%) na = not applicable (e.g., no activities included in unit)
A.3.3.3. Activities enable the learners to contribute ideas	Unit	1.00 = All activities (100%) 0.75 = Significant majority of activities (Approx 65%-99%) 0.50 = Moderate number of activities (Approx 30%-64%) 0.25 = Few activities (Approx 1% - 29%) 0.00 = None of the activities (0%) na = not applicable (e.g., no activities included in unit)
A.3.3.4. Activities engage learners in problem solving	Unit	1.00 = All activities (100%) 0.75 = Significant majority of activities (Approx 65%-99%) 0.50 = Moderate number of activities (Approx 30%-64%) 0.25 = Few activities (Approx 1% - 29%) 0.00 = None of the activities (0%) na = not applicable (e.g., no activities included in unit)
A.4. Program Materials		**(see EEI Criteria, Categories 2 and 4)**
A.4.0. Overall Average — excluding criterion (and subs) related to unit conclusion (A.4.5. and subs)	Unit	Mean of higher-level criteria — FILTERING OUT "consistent conclusion conclusion" AVERAGE (A.4.1, A.4.2, A.4.3, A.4.4, A.4.6)
A.4.1. Materials reflect a logical and coherent structure that facilitates efficient and effective teaching and learning	Unit	1 = yes 0 = no na = not applicable (e.g., ... hmmm cannot think of an example)
A.4.2. [CALC on subs] Materials include cues to delineate the logical organization of the materials	Unit	Calc on following subs (simple average)
A.4.2.1. Materials' organizational cues facilitate readily identifying and locating functional areas (major topics, lessons, preparation guidelines, etc.)	Unit	1 = yes 0 = no na = not applicable
A.4.2.2. Materials have titles, headings, and subheadings (e.g., for chapters and sections)	Unit	1 = yes 0 = no na = not applicable
A.4.2.3. Materials have introductory paragraphs	Unit	1 = yes 0 = no na = not applicable

Dimensions and Criteria	Eval Level	Scoring and Notes
A.4.2.4. Materials have use complete paragraphs, including a clear topic sentence, relevant support, and transitional words and expressions (e.g., “similarly, ” “in contrast, ” “As a result of…”)	Unit	1 = yes 0 = no na = not applicable
A.4.3. Materials employ visual cues to engage and support the reader	Unit	Calc on following subs (simple average)
A.4.3.1. Materials employ typographical aids (boldface, italics, bullets, spacing)	Unit	1 = yes 0 = no na = not applicable
A.4.3.2. Materials employ relevant visual aids (illustrations, photographs, charts, graphs, maps, etc.)	Unit	1 = yes 0 = no na = not applicable
A.4.3.3. Materials employ manageable, not overwhelming, visual stimuli	Unit	1 = yes 0 = no na = not applicable
A.4.3.4. Materials employ visual cues (highlighting, sidebars, icons, etc.) to indicate important terms and content	Unit	1 = yes 0 = no na = not applicable
A.4.4. Materials use a consistent method of orienting reader to the focus or intent of each section (focus questions, objectives, topic list, etc.)	Unit	1.00 = All sections (100%) 0.75 = Significant majority of sections (Approx 65%-99%) 0.50 = Moderate of sections (Approx 30%-64%) 0.25 = Few (Approx 1% - 29%) 0.00 = None of the sections (0%) na = not applicable (e.g., no sections included in unit)
A.4.5. Materials use a consistent method of concluding each section	Unit	1.00 = All sections (100%) 0.75 = Significant majority of sections (Approx 65%-99%) 0.50 = Moderate of sections (Approx 30%-64%) 0.25 = Few (Approx 1% - 29%) 0.00 = None of the sections (0%) na = not applicable (e.g., no sections included in unit)
A.4.6. Unit includes follow-up questions	Unit	[CALC on subs; arithmetic mean of A.4.6.1 and A.4.6.2]
A.4.6.1. Unit includes comprehension questions	Unit	1 = yes 0 = no

Dimensions and Criteria	Eval Level	Scoring and Notes
		na = not applicable
A.4.6.2. Unit includes application questions	Unit	1 = yes 0 = no na = not applicable
A.5. Assessments		**(see EEI Criteria, Category 3)**
A.5.1. Units, collectively, provide strategies and tools for continually measuring student achievement	Overarching	1 = yes 0 = no na = not applicable
A.5.2. Units, collectively, include formative evaluation strategies and instruments	Overarching	1 = yes 0 = no na = not applicable Formative assessments or evaluations help build skills and knowledge by providing interim opportunities to apply learning and get feedback (e.g., "check your understanding").
A.5.2.1. Answer keys, suggested responses, or evaluation guidelines are provided for formative evaluations	Formative Instrument	1.00 = All instruments (100%) 0.75 = Significant majority of instruments (Approx 65%-99%) 0.50 = Moderate number of instruments (Approx 30%-64%) 0.25 = Few instruments (Approx 1% - 29%) 0.00 = None of the instruments (0%) na = not applicable (e.g., no instruments included in curriculum)
A.5.3. Units, collectively, include summative evaluation strategies and instruments	Overarching	1 = yes 0 = no na = not applicable Summative assessments or evaluation indicate whether the student has successfully completed the unit of instruction (e.g., "final exam" for unit).
A.5.3.1. Answer keys, suggested responses, or evaluation guidelines are provided for summative evaluations	Summative Instrument	1.00 = All instruments (100%) 0.75 = Significant majority of instruments (Approx 65%-99%) 0.50 = Moderate number of instruments (Approx 30%-64%) 0.25 = Few instruments (Approx 1% - 29%) 0.00 = None of the instruments (0%) na = not applicable (e.g., no instruments included in curriculum)
A.5.3.2. Summative instruments include items that sample the full range of learning objectives,	Summative Instrument	1.00 = All instruments (100%)

Dimensions and Criteria	Eval Level	Scoring and Notes
including terminal performance and enabling objectives		0.75 = Significant majority of instruments (Approx 65%-99%) 0.50 = Moderate number of instruments (Approx 30%-64%) 0.25 = Few instruments (Approx 1% - 29%) 0.00 = None of the instruments (0%) na = not applicable (e.g., no instruments included in curriculum)
A.5.3.3. Summative instruments distinguish between those who can meet the learning objectives and those who do not	Summative Instrument	1.00 = All instruments (100%) 0.75 = Significant majority of instruments (Approx 65%-99%) 0.50 = Moderate number of instruments (Approx 30%-64%) 0.25 = Few instruments (Approx 1% - 29%) 0.00 = None of the instruments (0%) na = not applicable (e.g., no instruments included in curriculum)

B. School/Teacher Support Yardstick

Dimensions and Criteria	Eval Level	Scoring and Notes
B.1. Implementation support		
B.1.1. Materials provide clear context for the program elements and materials (roadmap, overview of elements and relationship among them)	Overarching	This likely will be "na" for most units. Presumably it will be appropriate for some chunk (e.g., an "introductory unit")
B.1.2. Materials include a summary of units	Overarching	This likely will be "na" for most units. Presumably it will be appropriate for some chunk (e.g., an "introductory unit")
B.1.3. Overall for Unit Intro	Unit	Calc on subs (mean of B.1.3.1, B.1.3.2, B.1.3.3)
B.1.3.0. Unit includes an introduction, overview, or advanced organizer.	Unit	1 = yes 0 = no na = not applicable
B.1.3.1. Unit introduction, overview or advanced organizer describes overall focus of unit	Unit	1 = yes 0 = no na = not applicable
B.1.3.2. Unit introduction, overview or advanced organizer describes overall goal(s) or objective(s) — or both — of unit	Unit	1 = yes 0 = no na = not applicable
B.1.3.3. Unit introduction, overview or advanced organizer previews / overviews lessons included in unit	Unit	1 = yes 0 = no na = not applicable
B.1.4. Unit includes clear statement of which Content Standards are supported by lessons in the unit	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g. no lessons in unit or no objectives in unit)
B.1.5. [CALC from subs] Unit provides logistical and delivery guidance	Unit	Average (mean) of subs' numeric values (B.1.5.1, B.1.5.2, B.1.5.3)
B.1.5.1. Unit includes timing guidelines for lessons	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%)

Dimensions and Criteria	Eval Level	Scoring and Notes
		na = not applicable (e.g. no lessons in unit or no objectives in unit)
B.1.5.2. Unit includes recommendations or ideas for delivering lessons	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g. no lessons in unit or no objectives in unit)
B.1.5.3. Unit include recommendations or ideas for reinforcing lessons	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g. no lessons in unit or no objectives in unit)
B.1.6. Overall for Unit enhancing/expanding related learning	Unit	Calc on following subs (mean of B.1.6.0 through B.1.6.4)
B.1.6.0. Unit includes suggestions for enhancing and expanding related learning	Unit	1 = yes 0 = no na = not applicable
B.1.6.1. Include suggestions and guidance for group discussions (topics, questions, etc.)	Unit	1 = yes 0 = no na = not applicable
B.1.6.2. Include suggestions and guidance for follow-on activities	Unit	1 = yes 0 = no na = not applicable
B.1.6.3. Include references to supporting resources to expand knowledge (articles, web sites, etc.)	Unit	1 = yes 0 = no na = not applicable
B.1.6.4. Other (Specify)	Unit	1 = yes 0 = no na = not applicable
B.2. Implementation flexibility		
B.2.1. Materials are modular	Overarching	1 = yes 0 = no na = not applicable

Dimensions and Criteria	Eval Level	Scoring and Notes
B.2.2. Materials provide suggestions / guidance for adapting or tailoring delivery	Overarching	1 = yes 0 = no na = not applicable
B.2.3. Design includes methods for extending learning beyond the classroom (to the rest of the school, to the home, to the community)	Overarching	1 = yes 0 = no na = not applicable
B.2.4. Design/approach calls for manageable teacher time commitment	Overarching	This refers to the minimum time commitment to delivery REQUIRED lessons/activities. (EXCLUDES teacher orientation meeting and follow up meetings, which cannot be estimated based on a review of materials.) For Energenius assume any one unit -- EXCLUDING "extended" or "augmented" activities and materials (the bare minimum to get through the unit). For Green Schools assume only the "energy audit" by team (none of the lessons) For Living Wise assume all things spec'd as "main stream" in teacher book For PEAK, assume full curriculum and any four labs (Assumptions are based on the way the program is implemented) 1.00 = Min is <= 5 hr 0.75 = Min is <= 10 hr 0.50 = Min is <= 20 hr 0.25 = Min is <= 40 hr 0.00 = Min is > 40 hr na = not applicable
B.2.5. Design/approach leverages students (teaching others, leading activities, etc.)	Overarching	1 = yes 0 = no na = not applicable
B.3. Implementation sustainability		
B.3.1. [CALC on D] Percentage of lessons that require NEITHER special materials nor equipment that must be purchased if used AFTER program participation has ended	Overarching	[CALC based on Section D] if there is "na" or 1 in D.1.7. AND D.2.7. then = 1 else = 0 Count(D.2.7)/Sum(D.2.7)

Dimensions and Criteria	Eval Level	Scoring and Notes
		"na" = no materials/equip required 1 = available for free after program
B.3.2. [CALC on subs] Aspects of the program are available to teachers AFTER program participation has ended	Overarching	[CALC based on subs] CHECK web site If necessary, check with program staff
B.3.2.1. Lessons and activities available to teachers AFTER program participation	Overarching	1 = yes 0 = no na = not applicable
B.3.2.2. [CALC on D] Special materials available to teachers AFTER program participation	Overarching	[CALC based on Section D] AVERAGE D.1.7.
B.3.2.3. [CALC on D] Special equipment available to teachers AFTER program participation	Overarching	[CALC based on Section D] AVERAGE D.2.7.
B.3.2.4. Assemblies or speakers available to teachers AFTER program participation	Overarching	1 = yes 0 = no na = not applicable
B.3.2.5. Events (field trip opportunities, contests, fairs, etc.) available to teachers AFTER program participation	Overarching	1 = yes 0 = no na = not applicable
B.3.2.6. Other aspects available to teachers AFTER program participation (SPECIFY)	Overarching	1 = yes 0 = no na = not applicable
B.3.3. [CALC on subs] Aspects of the program are available to students (or parents or both) AFTER program participation has ended	Overarching	[CALC based on subs] CHECK web site If necessary, check with program staff
B.3.3.1. Self-guided lessons or activities available to students AFTER program participation	Overarching	1 = yes 0 = no na = not applicable
B.3.3.2. Special materials available to students AFTER program participation	Overarching	1 = yes 0 = no na = not applicable
B.3.3.3. Special equipment available to students AFTER program participation	Overarching	1 = yes 0 = no na = not applicable

Dimensions and Criteria	Eval Level	Scoring and Notes
B.3.3.4. Events (field trip opportunities, contests, fairs, etc.) available to students AFTER program participation	Overarching	1 = yes 0 = no na = not applicable
B.3.3.5. Other aspects available to students AFTER program participation (SPECIFY)	Overarching	1 = yes 0 = no na = not applicable
B.3.4. [CALC on subs] A variety of methods are used to provide access to relevant aspects of the program AFTER program participation has ended.	Overarching	[CALC based on subs] CHECK web site If necessary, check with program staff
B.3.4.1. Key resources are available online on web site (primary program materials)	Overarching	1 = yes 0 = no na = not applicable
B.3.4.2. Key resources are downloadable from web site (primary program materials)	Overarching	1 = yes 0 = no na = not applicable
B.3.4.3. Key resources delivered (via mail, etc.) upon request (primary program materials)	Overarching	1 = yes 0 = no na = not applicable
B.3.4.4. Other (SPECIFY)	Overarching	1 = yes 0 = no na = not applicable
B.4. Alignment with relevant Content Standards for California Public Schools		**(see EEI Criteria, Category 1)**
B.4.1. [Calc on subs] Lessons and activities are targeted to specific grade levels	Unit	1 = yes 0 = no na = not applicable
B.4.2. Lessons and activities map directly to “Strands” or “Disciplines” defined in Standards	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons) In English Language Development, strands include Listening and

Dimensions and Criteria	Eval Level	Scoring and Notes
		Speaking, Reading, Writing, etc. Each strand is composed of substrands. For example Listening and Speaking strand includes substrands for Comprehension, Organization and Delivery, etc. In Math, K-7 strands include Number Sense, Algebra and Functions, Measurement and Geometry, etc. In Math 8-12, "disciplines" include Algebra I, Geometry, Algebra II, etc. [NB: some of the disciplines are required; some are elective.]
B.4.3. There is a clear, logical linkage between lessons and activities to Standards goals (specified for each strand/discipline)	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons)
B.4.4. [CALC on subs] Materials conform to EEI (Education and the Environment Initiative) Instructional Materials Evaluation Criteria for Science	Unit	[CALC based on subs. Mean of B.4.4.1, B.4.4.2, B.4.4.3, B.4.4.4, B.4.4.5, B.4.4.6]
B.4.4.1. Are scientifically accurate	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons)
B.4.4.2. Refer to CA Science Content Standards (no reference to national standards or benchmarks or any standards other than CA Content Standards)	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons)
B.4.4.3. Include examples directly supportive of the Standards that give direct attention to the responsibilities of all people to create and maintain a healthy environment and use resources wisely	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons)

Dimensions and Criteria	Eval Level	Scoring and Notes
B.4.4.4. Support the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons)
B.4.4.5. Provide explicit instruction in science vocabulary that emphasizes the usage and meaning of common words in a scientific context	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons)
B.4.4.6. Employ proper grammar and spelling	Unit	1.00 = All lessons (100%) 0.75 = Significant majority of lessons (Approx 65%-99%) 0.50 = Moderate number of lessons (Approx 30%-64%) 0.25 = Few lessons (Approx 1% - 29%) 0.00 = None of the lessons (0%) na = not applicable (e.g., no lessons)

C. Learning Focus Yardstick

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
C.1. Development of energy efficiency concepts		
C.1.0. Percentage of units addressing energy efficiency concepts	Overarching	Number of units addressing / total number of units countif(C.1.1. = 1) / counta (C.1.1.1.)
C.1.1. Unit includes elements (topics, lessons, activities) that address energy efficiency	Unit	1 = yes 0 = no na = not applicable
C.1.2. Unit positions the importance and benefits of saving energy	Unit	1 = yes 0 = no na = not applicable
C.1.3. Unit addresses measures and actions that can reduce energy consumption	Unit	1 = yes 0 = no na = not applicable
C.1.4. Unit includes examples of impact and benefits of energy efficiency measures and actions	Unit	1 = yes 0 = no na = not applicable
C.1.5. Unit compares and contrasts wasteful and energy efficient alternatives	Unit	1 = yes 0 = no na = not applicable
C.1.6. Unit includes specific calls to action to increase energy efficiency	Unit	1 = yes 0 = no na = not applicable
C.2. Development of concepts specific to renewable energy sources		
C.2.0 Percentage of units addressing concepts specific to renewable energy sources	Overarching	Number of units addressing / total number of units countif(C.1.1. = 1) / counta (C.1.1.1.)
C.2.1. Unit includes elements (topics, lessons, activities) that address renewable energy	Unit	1 = yes 0 = no na = not applicable
C.2.2. Unit positions the importance and benefits of renewable energy	Unit	1 = yes 0 = no na = not applicable
C.2.3. Unit includes examples of renewable energy	Unit	1 = yes

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
		0 = no na = not applicable
C.2.4. Unit includes examples of how renewable energy is generated	Unit	1 = yes 0 = no na = not applicable
C.2.5. Unit includes specific calls to action re. renewables	Unit	1 = yes 0 = no na = not applicable
C.3. Development of concepts specific to demand response and demand reduction		
C.3.0. Percentage of units addressing concepts specific to demand response and demand reduction	Overarching	Number of units addressing / total number of units countif(C.1.1. = 1) / counta (C.1.1.1.)
C.3.1. Unit includes the concept of energy demand (vs. consumption)	Unit	1 = yes 0 = no na = not applicable
C.3.2. Unit includes elements (topics, lessons, activities) that address demand reduction	Unit	1 = yes 0 = no na = not applicable
C.3.3. Unit includes elements (topics, lessons, activities) that address demand response	Unit	1 = yes 0 = no na = not applicable
C.3.4. Unit positions the importance and benefits of reducing demand (general demand reduction or demand response or both)	Unit	1 = yes 0 = no na = not applicable
C.3.5. Unit includes examples of impact and benefits of demand response	Unit	1 = yes 0 = no na = not applicable
C.3.6. Unit includes examples of impact and benefits of sustained demand reduction	Unit	1 = yes 0 = no na = not applicable
C.3.7. Unit includes examples of impact and benefits of permanent load shift	Unit	1 = yes 0 = no na = not applicable

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
C.3.8. Unit includes specific calls to action to lowering demand	Unit	1 = yes 0 = no na = not applicable
C.4. Development of awareness, knowledge and appreciation (and pursuit) of green careers (careers in clean energy fields) :		
C.4.0. Percentage of units addressing awareness, knowledge and appreciation (and pursuit) of green careers (careers in clean energy fields) :	Overarching	Number of units addressing / total number of units countif(C.1.1. = 1) / counta (C.1.1.1.)
C.4.1. Unit includes elements (topics, lessons, activities) that address green careers	Unit	1 = yes 0 = no na = not applicable
C.4.2. Describe the personal benefits associated with green careers	Unit	1 = yes 0 = no na = not applicable
C.4.3. Describe the benefits to environment/society associated with green careers	Unit	1 = yes 0 = no na = not applicable
C.4.4. Present role models in green careers	Unit	1 = yes 0 = no na = not applicable
C.4.5. Include pointers to approaches or next steps to developing a green career	Unit	1 = yes 0 = no na = not applicable
C.5. Linkages to appropriate subject/content areas		
C.5.0. Number of subject/content areas addressed by units — excluding math and science	Overarching	Number of units addressing / total number of units countif(C.1.1. = 1) / counta (C.1.1.1.)
C.5.1. [CALC on subs] Include appropriate linkages to relevant content areas in addition to Math and Sciences (e.g., Language, Sociology) — Number of links to non-Math, non-Science areas	Unit	Countif >0 in range for subs other than math and science. C.5.1.3, C.5.1.4, C.5.1.5, C.5.1.6. If >0 value = yes (1); else value = no (0)
C.5.1.1. Math	Unit	1 = yes 0 = no na = not applicable

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
C.5.1.2. Science	Unit	1 = yes 0 = no na = not applicable
C.5.1.3. Sociology	Unit	1 = yes 0 = no na = not applicable
C.5.1.4. Biology	Unit	1 = yes 0 = no na = not applicable
C.5.1.5. Language Arts	Unit	1 = yes 0 = no na = not applicable
C.5.1.6. Other (SPECIFY)	Unit	1 = yes 0 = no na = not applicable

D. Materials and Equipment

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
D.1. Special Materials		
D.1.1. Requires ANY materials	Lesson	1 = yes 0 = no na = not applicable "Materials" refers to consumables; includes pencil, paper, markers, chalk, crayons, etc. as well as the types of things described below as "special materials" (“Consumable” means that it typically is used only once for a given project.)
D.1.2. Provides LIST of ALL materials needed ("special" materials and other materials)	Lesson	1.00 = All needed materials (100%) 0.75 = Significant majority of needed materials (Approx 65%-99%) 0.50 = Moderate of needed materials (Approx 30%-64%) 0.25 = Few needed materials (Approx 1% - 29%) 0.00 = None of the needed materials (0%) na = not applicable (no materials required)
D.1.3. Provide explicit instructions for organizing and safely using materials	Lesson	1 = yes 0 = no na = not applicable
D.1.4. Requires SPECIAL materials	Lesson	1 = yes 0 = no na = not applicable “Special materials” refers to consumables not typically readily available in classroom. (“Consumable” means that it typically is used only once for a given project.) Examples of special materials include wire and other elements to “build your own motor, ” algae and fertilizer used to grow “bio fuel, ” or chemicals used in thermal energy experiments. Examples of materials that are NOT considered “special materials” include standard paper, pencils, markers, chalk, crayons.
D.1.5. Provides SPECIAL materials needed	Lesson	1.00 = All special materials (100%) 0.75 = Significant majority of special materials (Approx 65%-99%) 0.50 = Moderate of special materials (Approx 30%-64%)

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
		0.25 = Few special materials (Approx 1% - 29%) 0.00 = None of the special materials (0%) na = not applicable (no materials required)
D.1.6. Approximate, estimated ease and cost of obtaining SPECIAL materials DURING program participation has ended	Lesson	1 .0 = Available for free through program 0.5 = Available easily and cheaply during participation (Cheaply is ≤ $25) (Easily is typically available through program or at “big box,” grocery, pharmacy, etc.) 0.0 = Difficult or expensive to obtain during program participation (Expensive is >$25) (Difficult is not typically available through program or at “big box, ” grocery, pharmacy, etc.)
D.1.7. Approximate, estimated ease and cost of obtaining special materials AFTER program participation has ended	Lesson	1 .0 = Available for free through program 0.5 = Available easily and cheaply after participation (Cheaply is ≤ $25) (Easily is typically available through program or at “big box,” grocery, pharmacy, etc.) 0.0 = Difficult or expensive to obtain after program participation (Expensive is >$25) (Difficult is not typically available through program or at “big box, ” grocery, pharmacy, etc.)
D.2. Special Equipment		
D.2.1. Requires ANY equipment	Lesson	1 = yes 0 = no na = not applicable “Equipment” refers to non-consumables that typically would be found in the classroom, such as desk, clock, blackboard or whiteboard, blackboard or whiteboard erasers, etc., as well as the types of things described below as "special equipment." (“Non-consumable” means it may be used multiple times for different activities or by different students.)
D.2.2. Provides LIST of ALL equipment needed ("special" equipment and other equipment)	Lesson	1.00 = All needed equipment (100%) 0.75 = Significant majority of needed equipment (Approx 65%-99%) 0.50 = Moderate amount of needed equipment (Approx 30%-64%) 0.25 = Few/little needed equipment (Approx 1% - 29%)

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
		0.00 = None of the needed equipment (0%) na = not applicable (e.g., no equipment needed)
D.2.3. Provide explicit instructions for organizing and safely using equipment	Lesson	1 = yes 0 = no na = not applicable
D.2.4. Requires SPECIAL equipment	Lesson	1 = yes 0 = no na = not applicable "Special equipment" refers to non-consumables typically not readily available in classroom. ("Non-consumable" means it may be used multiple times for different activities or by different students.) Examples of special equipment include light meters, amp meters, and thermometers.
D.2.5. Provides SPECIAL equipment needed	Lesson	1.00 = All special equipment (100%) 0.75 = Significant majority of special equipment (Approx 65%-99%) 0.50 = Moderate amount of special equipment (Approx 30%-64%) 0.25 = Few/little special equipment (Approx 1% - 29%) 0.00 = None of the special equipment (0%) na = not applicable (e.g., no equipment special)
D.2.6. Approximate, estimated ease and cost of obtaining SPECIAL equipment DURING program participation has ended	Lesson	1 .0 = Available for free through program 0.5 = Available easily and cheaply during participation (Cheaply is ≤ $25) (Easily is typically available through program or at "big box," grocery, pharmacy, etc.) 0.0 = Difficult or expensive to obtain during program participation (Expensive is >$25) (Difficult is not typically available through program or at "big box, " grocery, pharmacy, etc.)
D.2.7. Approximate, estimated ease and cost of obtaining special equipment AFTER program participation has ended	Lesson	1 .0 = Available for free through program 0.5 = Available easily and cheaply after participation (Cheaply is ≤ $25) (Easily is typically available through program or at "big box," grocery, pharmacy, etc.)

Dimensions and Criteria	Eval Level	LIST-Ydstk A Notes
		0.0 = Difficult or expensive to obtain after program participation (Expensive is >$25) (Difficult is not typically available through program or at “big box, ” grocery, pharmacy, etc.)

Appendix C: Educational Materials Reviewed

The following summarizes the materials that the Evaluation Team reviewed during the instructional design assessment for each of the programs.

Energenius

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					
General					
2011 Energenius Educational Program Survey	na	2	Teacher		Two-sided form with survey on front and postage-paid mailback format on back
2011 Energenius Educational Program Survey	na	2	Teacher		Two-sided form with survey on front and postage-paid mailback format on back
Online Energy Resources for Educators	na	22	Teacher		• Welcome • Educational Programs for PG&E's School Customers • Online Energy Resources • Energy Saving Tips for Teachers
Energenius Educational Series for Grades K-8 Publishing House Catalog	na	10	Teacher		Half-page size booklet: • The ENERGENIUS Educational Series • Kindergarten • Grades 1-3 • Grades 4-8 • Other Energy Educational Resources
Energenius Education Program Free from PG&E	na	2	Teacher		Two-sided form with order form on front and postage-paid mailback format on back
Big Book					
I am an Energenius! Coloring Calendar	k–1	15	Student	Home	"Blank" calendar with line art and EE tips on facing page
The Energenius Little Book	k–1	14	Student	Home	Song lyrics; letter to family; 6 simple activities to do alone or with family

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					
Energenius Kindergarten Program Teacher's Guide	k–1	30	Teacher		• Introduction — Overview, intro to lessons • Lessons — for each of six lessons ○ Correlation to Content Standards ○ Teacher Background ○ Student Objectives ○ Materials ○ [Vocabulary] ○ Procedures ○ [Explanations/Discussions of Pages in (relevant student material)] ○ [Description of Activities in (relevant student material)] ○ Extending the Lesson ○ [Resources on Safety]
E Program					
Calculator	4–5	2	Student	Home	Mechanical paper device for illustrating energy usage. A slide with information about different appliances is pulled through a sleeve with cutout windows that identify appliance, length of use and cost to run appliance. One side shows natural gas usage; the other shows electricity usage.
Energy Extras	4–5	6	Home	Student	Tri-fold flier: ○ 8 Energy-saving tips ○ Mail-back for more on PG&E programs for homes ○ 6 Environment-saving tips ○ URLs for more info on helping environment and reducing climate change
Ebook: Energy Exercises and Experiments	4–5	31	Student		Brief readings, exercises and a few experiments and games — plus glossary
A Year of Energy Activities Calendar	4–5	25	Student	Home	"Blank" calendar with graphics and suggested activities on facing page

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					

Eprogram Teacher's Guide	4–5	54	Teacher		• Sequence of Lessons
					• Introduction and Overview
					• Lessons — for each of four regular lessons and one extension lesson
					  ○ Teacher Background
					  ○ Student Objectives
					  ○ Time Required
					  ○ Materials Provided
					  ○ Connecting to the Internet
					  ○ Vocabulary
					  ○ Procedures
					  ○ Extension of the Lesson
					• Answer Key
					• Correlations to California State Board of Education Content Standards for Grades 4-5
					• Energy-Saving Tips for Classrooms

Green Jobs					
Poster	7–12	1	Student		Poster

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					

(no title page) Energenius Green Career Resource Guide	7–12	66	Student		[Work in progress]
					• Introduction
					• Important California green jobs
					  ○ Skilled Trades
					  ○ Renovations/hazardous materials
					  ○ Jobs in Sustainable Agriculture
					  ○ Recycling
					  ○ Professions
					  ○ Managers/Planners
					  ○ Technicians/Installers
					  ○ Government/Regulatory
					• Green Job Training Resources

Working in a World of Green Jobs	7–12	11	Student		[Work in progress] • Welcome • Incomplete set of activities about green jobs • Table of Contents does not match remainder of booklet
Green Jobs Teacher Guide	7–12		Teacher		[Work in progress] Missing component: Teacher Guide
Energy and Me					
Poster	2–3	1	Student		Poster
Energy and Me	2–3	45	Student		• Make it a Habit • Student Activities • Energy Connections

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					
Poster	2–3	1	Student		Poster

Teacher's Guide Energy and Me	2–3	60	Teacher		• Introduction
					• Lessons — for each of four lessons
					  ○ Lesson at a Glance
					  ○ Teacher Background
					  ○ Student Objectives
					  ○ Materials
					  ○ Time Needed
					  ○ Vocabulary
					  ○ Procedures
					  ○ Extending the Lesson
					• Glossary
					• Appendix
					  ○ Duplicate Poster Squares
					  ○ Answer Keys for Student Activities
					  ○ Educational Resources from PG&E
					  ○ Correlations to California State Board of Education Content Standards for Grades 2-3

Energy Check-up for the Environment					
Energy Check-Up for the Environment	4–6	27	Student		• Welcome • Six activities—five at school plus a home energy check-up • Learning More: Connecting to the Internet • Glossary

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					

Teacher's Guide Energy Check-Up for the Environment	4–6	44	Teacher		• Introduction
					• Lessons — for each of three lessons with two activities per
					  ○ Lesson at a Glance
					  ○ Teacher Background
					  ○ Student Objectives
					  ○ Materials
					  ○ Time Needed
					  ○ Vocabulary
					  ○ Procedures
					• Glossary
					• Appendix
					  ○ Answer Keys for Student Activities
					  ○ Educational Resources from PG&E
					  ○ Correlations to California State Board of Education Content Standards for Grades 4-6

Light Right					
Light Right Student Workbook	6–8	15	Student		Half-page size booklet: • Introduction • Information on Researching and Presenting the ThrEE Es • Pages to take notes on each student presentation • Activities correlating to four lessons in Teacher Guide • Lighting Gallery • Glossary • Message to Parents and Guardians
Light Right ThrEE Es Energy, Electricity, and Environment	6–8	36	Student		Activity Cards (front and back) for 18 student presentations
Light Right Energy Source Cards	6–8	20	Student		Energy Sources Cards for energy efficiency (1 card) and specific energy sources (9 cards). Used for 9 student presentations.

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					

Light Right Program Teacher's Guide	6–8	56	Teacher		• Introduction and Overview
					• Lessons—for each of four lessons
					  ○ Teacher Background
					  ○ Student Objectives
					  ○ Time Required
					  ○ Materials
					  ○ Vocabulary
					  ○ Procedures
					  ○ Extending the Lesson
					• Appendix A
					  ○ Summary of Key Ideas
					  ○ Answer Key: Three Es Cards
					  ○ Three Es Cards
					• Appendix B
					  ○ Correlations to California State Board of Education Content Standards
					  ○ for Grades 6-8

Energy Patrol					
Energy Patrol Handbook An Educator's Guide to School Energy Patrols	na	76	Teacher		• Descriptions of two videos • Introduction—Why Energy Patrol • Section 1: What Is an Energy Patrol • Section 2: Five-Step Educational Approach • Section 3: Take Action—Implement the Energy Patrol • Section 4: Correlations of Energy Patrol Activities with California Content Standards • Section 5: Energy Education Curriculum and Resources • Section 6: Glossary for Teachers • Section 7: Appendix

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					
Transportation, Energy, and the Environment					
Transportation, Energy and the Environment, Student Activities, Science Projects, Research Discovery	6–8	45	Student		[Work in progress] • Why Study about Transportation, Energy, and the Environment? • Thirteen Activities • Glossary
Posters	6–8	2	Student	Home	Two posters to encourage saving energy
Transportation, Energy and the Environment Teacher Guide	6–8		Teacher		[Work in progress] Missing component: Teacher Guide
Trees, Energy, and the Environment					
Grow Global	4–6	6	Home	Student	Tri-fold flier: • What Trees do for us and our Environment • Arbor Day • Energy Extras from PG&E! • Mail Back Grow Global Environment Pledge Card
Trees, Energy, and the Environment	4–6	32	Student		• Welcome • Eighteen activities • Glossary • Web Sites

Element Title	Grade	# pgs	Primary Audience	Secondary Audience	Element Description
Energenius					

Teacher's Guide Trees, Energy, and the Environment	4–6	46	Teacher		• Introduction and Overview
					• Lessons—for each of four lessons
					  ○ Lesson at a Glance
					  ○ Teacher Background
					  ○ Student Objectives
					  ○ Materials
					  ○ Time Needed
					  ○ Vocabulary
					  ○ Procedures
					  ○ Branching Out
					• Glossary
					• Correlations to California State Board of Education Content Standards for Grade 4-6

Water, Energy, and the Environment					
Teacher's Guide Water, Energy, and the Environment	5–8	46	Teacher		[Work in progress] • Introduction and Overview • Lessons—four lessons
Water, Energy, and the Environment	5–8	20	Student		[Work in progress] • Welcome • Seventeen Activities • Learning More About Activities
Water, Energy, and the Environment	5–8	2	Student		Two posters to encourage saving water
Website					
http://www. pge. com/energenius/ NOTE: Most all links except for the online Order Form are actually to areas that are outside the Energenius program.					

PEAK

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					
General					
PEAK Student Energy Actions 2010 Teacher Resource Guide Book cover and introduction	na	10	Teacher		• Table of Contents • Introduction Each chapter of Teacher Guide is in a separate file; program description is in "Cover and Intro" file.
PEAK Student Energy Actions 2010 Teacher Resource Guide Book implementation	na	8	Teacher		• Implementing PEAK in Your Classroom • Pre-Test • Parent/Guardian Letter • Teacher Log • Post-Test • PEAK Toolkit Supply Reorder Form
PEAK Student Energy Actions 2010 Teacher Resource Guide Book Supplemental Materials	na	13	Teacher		• Pictorial Inventory of PEAK Toolkit • Choosing and Using a Power Source • Wattages of Common Household Appliances chart • Using the Scientific Method to Enhance PEAK Learning • Student Lab Report Form • Non-Fiction Reading Comprehension Tips • California Energy Commission Power Plant map • California's Major Electric Transmission Lines map pgs 7 and 8 are identical
PEAK Student Energy Actions Teacher Activity Log	na	2	Teacher		Teacher Activity Log form to evaluate at least four lessons taught and provide feedback to PEAK

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					
PEAK Program Materials (1 of 3)	na	16	Teacher		• PEAK Tool Kit Content List • PEAK Classroom Posters illustrations • Student Pre-Test • Teacher Activity Log • PEAK Energy Assembly Agenda • PEAK Energy Assembly: (Teacher) Evaluation form • Student Post-Test • PEAK Teacher Survey (2010-11 version)
PEAK Program Materials (2 of 3)	na	6	Teacher		• 2007 PEAK Teacher Resource Guidebook and FOSS Grade 3: Matter and Energy • 2007 PEAK Teacher Resource Guidebook and FOSS Grade 4: Electricity and Magnetism • 2010 PEAK Teacher Resource Guidebook and FOSS Grade 3: Matter and Energy • 2010 PEAK Teacher Resource Guidebook and FOSS Grade 4: Electricity and Magnetism • Energy Extensions: PEAK Labs and Activities
PEAK Program Materials (3 of 3) Career Explorer 2010 Teacher's Guide	na	36	Teacher		• Career Explorer Profiles for each of eleven PEAK lessons • Career Explorer Journal Activity Teacher Pages • Career Explorer Journal Activity Student Page
PEAK Student Energy Actions 2010 Artwork Calendar	na	14	Home		• Spiral bound 2011 calendar with student artwork
PEAK Student Energy Actions Teacher Activity Log	na	2	Teacher		Teacher Activity Log form to evaluate at least four lessons taught and provide feedback to PEAK Duplicate of file in Curriculum Individual Chapters component
PEAK Student Energy Actions 2010 Teacher Resource Guide Book (Color)	na	312	Teacher		Complete Teacher Resource Guide with all elements from Curriculum Individual Chapters component

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					
Unit-specific Material					

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 1	3–7	17	Teacher	Student	• Energy Resources
					  ○ Renewable and Non-Renewable Resources
					  ○ The 4 PEAK Energy Actions
					  ○ The Power Mix Game
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

PEAK Power Mix Game (Unit 1)	3–7	12	Teacher	Student	Power Mix Game narrative and materials (Unit 1)

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 2	3–7	25	Teacher	Student	• Electrical Generation
					  ○ Energy Transformations and Electrical Generation
					  ○ Exploring Smart Meter
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 3	3–7	19	Teacher	Student	• Greenhouse Gases
					  ○ Greenhouse Gas Simulation
					  ○ Carbon Footprint
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 4	3–7	19	Teacher	Student	• Introduction to Natural Gas
					  ○ Making Methane
					  ○ Conserving Natural Gas
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 5	3–7	22	Teacher	Student	• Insulation
					  ○ Insulation - Keeping Heat In and Keeping Heat Out
					  ○ Insulation Audit
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 6	3–7	20	Teacher	Student	• How Electricity Moves
					  ○ Conductors and Insulators
					  ○ Home Lighting Survey
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 7	3–7	19	Teacher	Student	• Circuits
					  ○ Series and Parallel Circuits
					  ○ Home Appliance Survey
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 8	3–7	21	Teacher	Student	• Exploring Peak Demand Time
					  ○ The Sagging Circuit
					  ○ Marketing Campaign
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 9	3–7	18	Teacher	Student	• Electricity and Magnetism
					  ○ Building an Electromagnet
					  ○ Energy Vampires
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 10	3–7	31	Teacher	Student	• Using Electricity to Do Work
					  ○ Motors
					  ○ Family Home Energy Action Plan
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
PEAK					

PEAK Student Energy Actions 2010 Teacher Resource Guide Book Unit 11	3–7	33	Teacher	Student	• A Healthy Energy Future
					  ○ Renew-A-Bean
					  ○ Renew-Our-State
					• Each section has:
					  ○ Lesson descriptions
					  ○ Student learning objectives
					  ○ Correlation to California academic content standards
					  ○ Materials/Resources
					  ○ Vocabulary
					  ○ Lesson Background
					  ○ Answer Keys
					  ○ Student Worksheets (Aud 2)

Supplemental Materials					

PEAK Bulbman's Quest to Green the Planet	3–7	7	Student	Home	• Take-Home Booklet
					  ○ Introduction to Parents
					  ○ Worksheet Activities for Students to Complete at Home
					  ○ Mail-In Card to Enter Solar Panel Backpack Drawing

010 PEAK Curriculum Enhancement Summary	na	4	Program Staff	Teacher	• Summary of changes to 2010 PEAK curriculum from earlier versions
Website(s)					
The Energy Coalition Promo: http://energycoalition. org/Peak/ Main home page: http://www. peakstudents. org/ PG&E territory: http://www.peakstudents.org/about_us/peaknorcal.asp SCE territory: http://www.peakstudents.org/about_us/peaksocal.asp					

LivingWise

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description

LivingWise					
General					
Poster	5–6	1	Teacher	Student	Poster to encourage teacher to collect Scantrons, distribute wristbands
Dear Parents Letter (Eng/Span)	5–6	2	Home	Student	Take home letter to introduce LW program to parents (Eng/Span versions)
Pre Survey, Home Check-Up, Home Activities, Post Survey	5–6	2	Student	Home	4-section Scantron Survey form for students to complete • Students do first and last sections in class. • Info from student workbooks is entered in sections 2 and 3.
Scantron Survey Results	5–6	10	na		Compiled Scantron Survey results for Spring 2010 program
Scantron Survey Results	5–6	9	na		Compiled Scantron Survey results for Fall 2010 program
(ALL) Units					
LivingWise Teacher Book	na	76	Teacher		• Welcome letter • Program Checklist • Student welcome letter • Lessons — for each of seven lessons: o [Explanations/Discussions of Pages in (relevant student material)] o [Description of Activities in (relevant student material)] • Program Completion Checklist • Additional Activities Answer Key • Pre-Post Survey Answer Key
LivingWise Student Guide	5–6	34	Student		Narrative and illustrations about natural resources, energy, electricity, water and conservation with FAQ and Glossary sections.
LivingWise Student Workbook	5–6	40	Student	Home	Parent/Guardian introduction to LivingWise Kit, activities and directions for installing water- and energy-saving kit contents, and family questionnaire about results. General information directed at student and parents.
Supplemental Materials					
LivingWise Additional Activities	5–6	11	Student		Students measure how much water they use (Water Tickets), complete five worksheet activities, and design a poster.
LivingWise Actividades Adicionales	5–6	11	Student		[Spanish version of above] Students measure how much water they use (Water Tickets), complete five worksheet

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
LivingWise					
					activities, and design a poster.
Website					
http://www.getwise.org/index.php					

Green Schools

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
Green Schools					
General					
SEAT Student Energy Auditor Training: How to Save Energy At Your School	na	2	Teacher		Trifold brochure explaining SEAT (Alliance To Save Energy) and inviting participation in Green Schools program.
Alliance to Save Energy's Green Schools Tool Kit Manual	na	48	Teacher		• Introduction • Correlations to Science Education Standards • Green Schools Tool Kit Contents Background Information • for the Teacher • About the Tools • Tool Kit Activities
Alliance to Save Energy's Green Schools Program Road Map Plan Template for John Adams Elementary School	na	2	Teacher	School Admin.	School plan for implementing Green Schools program
Alliance to Save Energy's Green Schools Program Road Map Plan Template for Prado View Elementary School	na	1	Teacher	School Admin.	School plan for implementing Green Schools program
Green Schools High School Student Awareness	na	2	Student		Student end-of-program feedback survey - high school
Green Schools Middle School/ Jr. High Student Awareness	na	2	Student		Student end-of-program feedback survey - middle school/junior high

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
Green Schools					
Green Schools Elementary Student Awareness	na	2	Student		Student end-of-program feedback survey - elementary school
Green Schools Elementary School Student Awareness Green Schools Middle School/Junior High Student Awareness Green Schools High School Student Awareness	na	6	Student		Student pre-program feedback surveys
(ALL) Primary Units					
Green Schools Primary Road Map Guide (K-8)	k–8	142	Teacher	School Admin.	• Introduction • Professional Development Workshop description • Expand Green Schools team; Add Students • Carry Out Immediate Energy-Saving Plan • Train Students to Identify Energy Saving Opportunities • Lead Curricular Activity • Compile Data and Upload to the I\Web • Interpret Data and Develop Recommendations to Save Energy • Mid Year Meeting • Refine and Carry Out Energy Savings Plan • Involve the Whole School • Involve Students in Green Career Activity • Share Recommendations; Report on Savings and Achievements • Educate and Engage Parents and Community Members • Ed of Year Celebration • Summer Shut Down • Supplemental Resources

Element Title	Grades	# pages	Primary Audience	Secondary Audience	Element Description
Green Schools					
(ALL) Secondary Units					
Green Schools Secondary Road Map Guide (6-12)	6–12	125	Teacher	School Admin.	• Introduction • Professional Development Workshop description • Expand Green Schools team; Add Students • Carry Out Immediate Energy-Saving Plan • Train Students to Identify Energy Saving Opportunities • Lead Curricular Activity • Compile Data and Upload to the I\Web • Interpret Data and Develop Recommendations to Save Energy • Mid Year Meeting • Refine and Carry Out Energy Savings Plan • Involve the Whole School • Involve Students in Green Career Activity • Share Recommendations; Report on Savings and Achievements • Educate and Engage Parents and Community Members • Ed of Year Celebration • Summer Shut Down • Supplemental Resources
Website(s)					
Main site: http://www.greenschoolsnational.com/index.html Resources — such as existing lessons — seem to be elsewhere, at the Alliance to Save Energy site: http://ase.org/resources/browse/165 The ACE website provides collateral information and assembly overview (no electronic file available for the marketing material that was distributed at teacher orientation workshop): http://www.acespace.org/teachers/about-presentation#overview					

Appendix D: Implementer Responses to Evaluation

Table 46. Implementer Responses to Evaluation

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
PEAK Student Energy Actions	"Percentage of lessons that require NEITHER special materials nor equipment that must be purchased if used AFTER program participation has ended"	Lessons require supplies to conduct lab activities. PEAK lessons are designed to be inquiry-based as a means for students to retain education. The supplies are essential to the inquiry-based learning experience and highly valued by educators to be the most useful in teaching energy efficiency topics to students as referenced on page 103/QPD6. Educators also reported that students learned about ways to save energy through the materials provided by PEAK that they would not have otherwise learned, as referenced on page 96/QSE2C. Educators have also communicated they enjoy most about PEAK is the hand-on activities/experiments/materials provided as cited on page 95/QSE3.	N/A
Green Schools	“It appears that the primary focus of Green Schools is the ‘school energy teams’ activities, which are targeted to lowering the schools kWh, rather than teaching all students in a class. (The lessons seem to be added almost as an afterthought.)”	The program premise is that energy savings and student learning about energy are synergistic. Both aspects are critical, and each strengthens the other. In fact, the program provides lessons at all levels, aligned to CA standards, that are relevant to each Road Map benchmark in the Road Map Guide, and teachers often use these lessons with whole classes.	This conclusion was drawn from multiple research methods: a review of program materials, observing teacher training and participant surveys. While this may not be the intention in program design, this evaluation found evidence of this and therefore it should be considered by program implementers.
Green	“Move toward a more	We agree that improvement is warranted and plan to develop a more	N/A

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
Schools	prescriptive approach to curriculum"	prescriptive approach for teachers to use the lessons. We also plan to review and redesign our program lessons, including targeting them more specifically to the K-5, middle and high school grade levels; thoroughly reviewing the standards correlations; and reworking the lesson objectives to be performance-based and clearly mapped to standards, as recommended by the evaluators on pages 29 and 41. In addition, we will develop more lessons and on-line resources at all grade levels that focus on IDSM, green career concepts and pathway options, and renewable energy.	
Green Schools	"Break up training sessions into specific grade levels (K-5, middle, high school) and tailor the training to those grade levels."	This is a very helpful suggestion, and we will make it a point to provide training specifically tailored to teachers at each of these three grade levels, either through breakout groups during our all-day training workshops or by holding separate workshops as funding allows.	N/A
Green Schools	"Look at ways to provide more robust support for teachers, possibly through online videos"	We agree and plan to create video instruction for current and new lessons to provide supportive resources for teachers. Some current ideas are to create a video on how to use the tools in the program's tool kit, how to do a simple energy audit of an area in a school, to explain and illustrate IDSM and renewable energy, and to show people in different green careers.	N/A
Green Schools	"Link and leverage programs to share resources"	These are valuable and exciting ideas, and we consider all of them quite doable. We plan to collaborate with Green Pathways, Energenius, and LivingWise representatives to develop a strategy for moving forward to link and leverage our program resources. We truly believe this will be a win-win for all involved. As mentioned in our responses to the evaluation of our Green Campus	N/A

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
		Program, for several years Green Campus interns have visited our Green Schools to conduct Energy Hog assemblies and discuss green careers. This has been somewhat limited due to geographic proximity, budget constraints, and busy intern schedules. We plan to work with our utility partners to strategize ways to ramp up these kinds of collaborative activities.	
	"we highly recommend that evaluation efforts include case studies"	We agree that our programs are difficult to evaluate with traditional methods. The struggle to do this was particularly apparent in this evaluation of the Green Schools Program, which operates as an entirely different program model than the other K-12 Connections programs to which it was compared, often resulting in "apples vs. oranges" type comparisons. Since Green Campus is the only university level Connections program, the shortcomings of the traditional evaluation approach were not as apparent, seemingly allowing the evaluators to elucidate a more in depth understanding of how that unique program operates, the level of student engagement, as well as areas to strengthen. One of the main strengths of both Green Schools and Green Campus is that they are designed as "planning" models that allow our school and campus teams to plan (with program training and support) how the program can best be tailored to their particular culture and needs and to select among the many program resources to carry out their plans. Though all our schools/campuses do work to achieve the same program goals, their approaches to reach them vary. We would enthusiastically welcome a case study approach to evaluating our programs and very much appreciate the ODC evaluators for this insight and for making this recommendation for future evaluations of our programs!	N/A
Green	"One barrier to implementation was	The issue of school administration buy-in is very rare, as the evaluators themselves point out. By way of example, superintendents, assistant	N/A

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
Schools	school administration buy-in to the program"	superintendents, facilities managers, and/or principals always attend the program's initial training workshop, specifically to support and encourage the school teams and to demonstrate their buy-in to the program. Also, the fact that our districts give a 50% return on savings back to there schools is evidence of strong buy-in and support of the program. Our experience is that the overwhelming majority of district administrators actively support the program, which is one of Green Schools' strengths.	
Green Schools	"Some schools have had green career profes-sionals speak at school assemblies. This may increase students' awareness of green careers but does not provide any resources for students to explore their options."	The Alliance agrees that we need to provide more career resources for students so they can continue to explore green careers, and we plan to develop them soon. We are also looking forward to being able to link to the career resources from Energenious and Green Pathways.	N/A
Green Schools	"Green School teachers expressed concern…since they must develop these materials on their own based on the Green Schools suggested materials rather than pre-designed and standards-compliant lessons."	We appreciate that the evaluation brought to light that some of the interviewees seemed unaware that the program provides lessons, though we don't know how many of the interviewees were teachers. This is a communication issue that we need to (and will) address. Because this misperception is noted several times in the report on the referenced page numbers above, we think it's important to respond. Although participating teachers can (and do) sometimes develop their own lessons, it is not a program requirement or necessity. Green Schools offers many pre-designed lessons at all grade levels, aligned to CA standards, which are included in the program's Road Map Guide under each benchmark tab, along with a table showing which educational standards the lessons are designed to meet. The program also provides	N/A

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
		access to lessons on the program website, also aligned to CA standards. During the initial training workshop, these lessons are pointed out to the teachers, including during a breakout session that focuses on how to integrate them into their curriculum. We wonder if there might have been confusion because each school team develops its own implementation plan, tailored to their unique school needs, but they are not required to create their own lessons. The pre-designed lessons that the program provides are resources that they can selectively use to implement their plans and to meet the "Lead a Curricular Activity" benchmark on the program's Road Map. Please note that in the Program Snapshot on p. 157, it is stated that the program "…provides over 200 possible lessons (all of which are CA standards compliant) that teachers may choose from." This is correct.	
Green Schools	"More than half of respondents (8) said that their Green Schools activities included green career activities."	We do not understand why these 8 respondents said this, as all schools do some kind of career awareness activity. During the 2011-2012 school year, every one of our 65 schools held at least one green career activity and collectively reached more than 14,000 students. It is possible that some of the people interviewed by the interviewers were not the ones planning these events, so were unaware that they had taken place.	N/A
Green Schools	"The design is relatively low in "sustainability" in terms of the apparent primary focus of the program (the energy team's efforts to lower the school's kWh). "	This statement seems to contradict an earlier statement in the study, which says "While Green Schools is costly and has a number of areas of improvement, it appears to be one of the easiest programs to sustain in schools without program support. Green Schools helps teachers develop the tools they need to incorporate energy efficiency concepts into the schools on their own." (p. 44).	These findings are from the detailed yardstick findings, while our findings on page 44 were based on the responses from the teacher/administrator interviews. Our interviews asked whether respondents would continue to teach the

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
			same energy efficiency topics, not the Green Schools program specifically, in the absence of program support; our yardstick only looked to the specific sustainability of the Green Schools program design and materials.
Green Schools	"Consider whether the program should continue with Green Schools under the WE&T umbrella of programs."	The above comment seems to reveal a perspective that informed much of the qualitative assessment of our program – that somehow learning about energy efficiency and applying that learning to achieve energy savings at school, are contradictory. On the contrary, as stated in the introduction, the Alliance's hybrid approach that uses the hands-on application of energy learning to the school building is a powerful educational tool. By engaging students in real-world, problem solving projects to influence behavior change, save energy, save money, and protect the environment, they are learning practical skills, which are needed in the green workforce. We have been told repeatedly by SCE staff that this hybrid approach is a significant strength of our program and what sets it apart from others. However, in this evaluation, the hybrid nature of our program seems to be regarded as a liability, at least as a WE&T program. We respectfully, but strongly disagree with this conclusion.	The primary issue is that this program experience tends to only happen for a small group of students at a school; which is why we discuss the reach of this program in terms of "direct" and "indirect" participants.
Green Campus	"green career development should be prioritized over energy savings projects."	We will adapt the program accordingly and plan to use energy savings as a means to strengthen the career development. In order to make this linkage more clear, program staff, in consultation with utility partners, plan to revisit how the program mission and goals are stated going forward. Also, program staff will work with our utility partners to adjust the	N/A

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
		program KPIs to better reflect the program's WE&T mission.	
Green Campus	The evaluation states that the program could increase networking opportunities between students cross-campus.	We agree, and in fact we have recently launched a new document sharing and networking site Central Desktop. This software allows staff and students to share documents and other resources as well as participate in cross-campus webinar meetings and trainings. Alliance staff will also work on providing additional opportunities to network via regional interaction. Travel restrictions may limit the latter except when campuses are in immediate proximity.	N/A
Green Campus	Low-income outreach described as "interns communicate broadly to entire campus, unclear as to how to incorporate their goal and whether it should apply to this program"	Although Green Campus cannot prove that it is reaching out to Low Income (LI) customers, several campuses including CSU San Bernardino, Cal Poly Pomona, and Humboldt State University are in lower income areas. Due to affirmative action, income and socioeconomic status of students is confidential. We appreciate that the evaluators understand the challenges in determining the number of LI customers Green Campus reaches at the university level.	N/A
Green Campus	The evaluators suggest that green career development activities need to have more depth.	While "supplemental" presence at career fairs has often paved the way for positive stakeholder relationships with campus career services and to more mature career development activities, we agree that we can elevate these projects moving forward. Program staff will encourage more projects that fall toward the top of the pyramid graph– i.e., toward "ongoing training courses (on-campus or off-campus)." Also on page 52, the evaluation references the need to expand for-credit internships and volunteers. This is also something that has required a maturation period between students and faculty stakeholders who serve as advisors and that the program plans to grow.	N/A

Program Name	Text Reference	Implementer Comment	Evaluation Team Response
Green Campus	"The program is also in touch with campuses at a high level to explore cross-cutting academic infusion strategies."	Program staff have made great strides to grow the academic infusion working groups, and agree that this group may lead to significant – and effective – changes in the implementation of energy efficiency topics at the college level. We will continue to mature and expand this effort. In addition, staff will work with students to increase not only for-credit internships but also energy efficiency themed homework assignments, lectures, and course modules.	N/A
Green Campus	"Some of the KPIs may be inappropriate for some campuses or cause interns to focus on less important areas of the program."	The evaluation notes that participating campuses vary in size (Table 42) and number of terms per year (semester v. quarter). This makes the program's outreach KPI more challenging for small schools and those campuses that are on a quarter system. The Alliance agrees with the suggestion of the need for a different, more fair indicator – perhaps one that is based on an annual percentage of people reached at each campus, and will work with utility partners to change the KPIs.	N/A