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Final Report

Process Evaluation of the 2006-2008 EARTH Education & Training Program

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PROCESS EVALUATION OF THE 2006-2008 EARTH EDUCATION & TRAINING PROGRAM



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ACKNOWLEDGEMENTS



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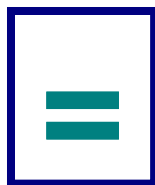


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EXECUTIVE SUMMARY

This report presents the findings of a process evaluation of the 2006-2008 EARTH Education & Training Program (formerly called the Integrated School-Based Program – ISBP) conducted by Research Into Action, Inc. for Southern California Edison (Edison) and funded through the public goods charge (PGC) for energy efficiency. The study is available for download at www.calmac.org.

The 2006-2008 EARTH Education & Training Program (EARTH Schools Program) consists of three distinct component programs: *Green Schools*, *LivingWise*[®], and *Green Campus*. These three efforts provide energy conservation education to students K-12 through college/university. Each effort is implemented by third-party implementers hired by Edison: Resource Action Programs[®] (RAP) implements *LivingWise*[®]; and the Alliance to Save Energy (ASE) implements both the *Green Schools* and *Green Campus* programs.

Each of these three programs has been subject to at least one process evaluation and program effects study since its introduction to California investor-owned utility (IOU) customers. This prior research enabled the current process evaluation to focus on areas of specific interest to Edison as it continually seeks to improve its programs. Simultaneous to this research, the California Public Utility Commission (CPUC) directed an impact evaluation of these programs under its Specialized Commercial program contract; the CPUC had not published its impact evaluation at the time this report was completed.

EVALUATION OVERVIEW

This process evaluation considered program activities for the academic years 2006-2007 and 2007-2008, and addresses the following key objectives of interest to Edison as it pursues continual program improvement. The evaluation:

- ➔ Identifies success factors and barriers to performance among schools participating in the *Green Schools* and *LivingWise*[®] Programs;
- ➔ Examines the roles of the *Green Schools*' Local Project Leaders and identifies opportunities to improve their effectiveness;
- ➔ Assesses the lesson plans for the *Green Schools* and *LivingWise*[®] Programs with respect to California educational standards;
- ➔ Assesses all instructional materials – including websites – for the *Green Schools*, *LivingWise*[®], and *Green Campus* programs with respect to best practices in education, in energy efficiency training programs, and in websites; and



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- ➔ Offers recommendations for program status reporting and delineation of key performance indicators, including measures of educational effectiveness.

In addition to meeting the research objectives and providing recommendations for continuous program improvement, the study enumerates criteria for assessing educational materials, curricula, and websites.

The process evaluation employed the following research methods: in-depth interviews with Edison and third-party program staff; on-site, in-depth interviews with teachers, school and district staff, and administrators at eight schools participating in Green Schools; telephone interviews with six teachers participating in LivingWise®; and a web survey of 12 of the 17 interns participating in Green Campus. In addition, the process team added about six process-related questions to each of the five impact surveys that the impact evaluation team designed and fielded for the different program participant groups.

The process evaluation team also examined the each program's participant materials, including lesson plans, activity guides, take-home kits, and websites. The process team included a science curriculum specialist. This specialist evaluated the program materials in light of best practices in: curriculum and instruction; energy efficiency education and training programs; and website design and content. Finally, the team reviewed program status reporting, program theory and logic models, and other program documentation.

EARTH SCHOOLS PROGRAM OVERVIEW

According to the Program Implementation Plan (PIP) for the CPUC's 2006-2008 program cycle, the EARTH Schools Program (then called ISBP) addresses the needs of the schools through a combination of student, teacher, and school administrator education programs; it also increases their awareness and knowledge of energy efficiency and water conservation, and what each individual can do to make a difference.

The EARTH Schools Program Manager and his supervisor, Edison's Residential Energy Efficiency Programs Manager, both emphasize that while Edison's responsibility is to address electricity use, the EARTH Schools Program addresses all forms of energy use, as well as that of water. Overall, the program seeks to educate students about resource conservation to influence attitudinal and behavioral changes that lead to greater energy conservation among students and their families and the broader community in which they live.

For the 2006-2008 cycle, the EARTH Schools Program was classified as a residential resource program with energy (kWh) savings goals. This cycle spans the 2006-2007 through 2008-2009 academic years.

Looking ahead, the EARTH Schools Program classification will change in the 2009-2011 program cycle, when it will be under the Statewide Workforce Education & Training Program (a core program), as described in the program PIP. Programs such as EARTH Schools are intending



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to stimulate interest in the fields of energy efficiency and environmental conservation, and to ensure students wanting to work in those fields will have the right early foundation. The Green Schools and Green Campus Programs will no longer be classified among Edison's resource programs, while the LivingWise[®] Program will continue its designation as a resource program.

The 2009-2011 EARTH Schools Program contracts will include performance requirements to ensure that Edison will be able to demonstrate to its stakeholders program effectiveness and continuous improvement. The current evaluation focuses on identifying current opportunities for improvement, and on recommending key performance indicators that might be tracked on an ongoing basis to contribute to a demonstration of program effectiveness and continuous improvement.

Green Schools Overview

The Green Schools Program (Green Schools) is formally *The Alliance to Save Energy Green Schools Program: Empowering Schools through Energy Efficiency*. The goals for Green Schools, as stated on the implementer's website, are to "improve education through hands-on, real-world learning about energy and energy efficiency and strengthen schools by saving money on energy costs." The implementer terms this approach one of "making energy efficiency both visible and valuable."

The 2006-2008 Green Schools Program at Edison was a two-year program that started at the district level and enrolled up to 25 schools per district into the program at one time. As a two-year program, 25 new Green Schools are enrolled each year and the 25 schools enrolled the previous year continue as second-year schools within the Edison service territory. (For the 2009-2011 program cycle, Green Schools will move to a primarily one-year format, with about one-quarter of schools selected to continue for a second year.)

Green Schools supports school grades K-12 to: engage students in understanding issues relating to energy; raise awareness of the value of and methods for achieving energy efficiency throughout the school and the community; implement efficiency practices; establish baseline data on energy use; perform school energy audits; make recommendations for behavioral and technical changes; and monitor on-going energy use data. Green Schools supports schools with instructional resources and through personalized services provided by Local Project Leaders (LPLs) employed by the program. The educational resources include lesson plans, activity plans, and energy-auditing kits. Green Schools' lessons are intended to be interdisciplinary, integrate into a teacher's regular curriculum, and correlate with state curriculum standards.

LivingWise[®] Overview

LivingWise[®] is an educational program developed and implemented by Resource Action Programs[®]. During the 2006-2007 and 2007-2008 academic years, 281 schools in 98 school



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districts in Edison’s territory taught the LivingWise® curriculum to approximately 52,000 students in 568 classrooms.

The implementer, in its Teacher Guide, describes LivingWise® as a:

“...hands-on program [that] teaches the importance of water, energy, and related environmental issues in your community. The program includes materials that teach students important lessons about energy and water, how we use each in our everyday lives, and why it is important to conserve.”

Teachers can cover the six topics – each in a single lesson or over multiple lessons – by conducting the activities included in the Teacher Guide. The *Conservation At Home* topic includes home activities for students using a kit of conservation items; students might complete them over the course of a week. The instructional materials are correlated with state curriculum standards.

In addition to a Student Guide, each participating student receives: a *Home Energy & Water Use Workbook*; a *LivingWise® Activity Kit* of energy- and water-saving tools and products for the student to extend the classroom learning to his or her home; a *Certificate of Achievement*; and a coupon for a free *Get Wise* wristband. Students, with help from their parents, install the devices in their homes and complete the associated Workbook. The program theory assumes parents become more informed about resource efficiency by helping their children install the items from the kit and complete the associated assignments, and, as a result, take advantage of opportunities for conservation in their homes.

Green Campus Overview

The Green Campus Program is an educational and direct-action program developed and implemented by The Alliance to Save Energy. During the 2006-2007 and 2007-2008 academic years, Green Campus had an active presence at University of California campuses of Irvine and Santa Barbara; California State University, San Bernardino; and California State Polytechnic University, Pomona. In addition to these four campuses in the Edison territory, Green Campus was active at nine other campuses in the territories of other California investor-owned utilities.

The Green Campus Program deploys student interns who can organize and prepare energy conservation activities that make it fun and easy for other students to participate in those activities, as well as support campus staff interested in taking energy efficiency steps. College student interns who participate in the program play a central leadership role in planning and carrying out the activities of the Green Campus Program under the guidance of program implementation staff and in consultation with campus faculty, administrators, and facility staff in a shared partnership effort.

The program implementer hires and trains between two and six student interns per campus, for a total of 40 hours a week of paid intern time per campus. The program implementer recruits program stakeholders at each campus to work with the intern team. Recruited stakeholders vary



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across the campuses, yet collectively include professors, facility staff, dining and residence directors, campus administrators, and university system administrators.

Interns lead activities geared towards achieving immediate cost- and energy-saving impacts on campus by encouraging students, faculty, and staff to adopt new behaviors as energy consumers. Consistent with its designation as an Edison resource acquisition program, in 2006-2008 Green Campus had as its primary focus the attainment of energy savings through intern-facilitated activities. Interns seek to raise awareness of energy efficiency through outreach campaigns or through the development and conduct of symposia and other extracurricular courses that educate students about energy conservation and sustainable environmental practices.

SUMMARY OF FINDINGS AND CONCLUSIONS

The *California Energy Efficiency Strategic Plan* (adopted by the California Public Utilities Commission toward the end of the 2006-2008 program cycle evaluated in this report) articulates the state's goal of energy efficiency workforce education and training. This visionary document is ahead of the state's curriculum standards. California, like virtually every other state, lacks educational content requirements for the teaching of the efficient use and conservation of natural resources. The state university system similarly lacks such curricula at the post-secondary level. The Green Schools, LivingWise[®] and Green Campus programs seek to fill this void by engaging students, their school and university communities, and their families and neighborhoods in energy efficiency actions and learning.

Two additional findings are relevant to all three programs.

One, each program has established a variety of continuous improvement processes internal to its operations. The programs solicit feedback from participants and advisory groups, and revise their activities and materials in response to the feedback obtained. The feedback and revision processes are both formal – occurring in annual cycles – and informal, as program staff interact with participants and learn of their experiences and recommendations. Finally, the programs have evolved in response to the recommendations of the prior process evaluations.

Two, each of the program staffs, as well as the Edison EARTH Schools manager are in agreement that program monthly and annual status reporting to Edison – legacies of the programs' early years and previous Edison managers – are unsatisfactory. Staff describe the reports as time-consuming to generate. The Edison manager and the evaluation team found the reports to poorly communicate indicators of program performance. Each of the program staffs expressed a willingness to work with the Edison manager to develop more satisfactory reporting formats.



Green Schools

Findings

The Green Schools Program has many ardent supporters among participating schools and districts. Many of the interviewed participants are passionate about environmental education and action; they are grateful the Green Schools Program offers them a forum and tools for teaching students, and for directly influencing the use of natural resources in school and district facilities, and in the homes of students and staff. Participants also appreciated the professional consulting and support they received from the Local Project Leaders.

Green Schools professional development, audit training and tools, planning and reporting documents, online utility manager, instructional resources, newsletters, and monthly reports support a complex and comprehensive district-focused, K-12, whole-school program. Green Schools encourages the custom design of implementation plans by each school's Green Team, with a focus on student-centered inquiry and student empowerment to design events and presentations and develop leadership.

The audit training and tools provide hands-on use of technology to understand environmental issues and propose solutions to school building energy conservation. Networking and developing a community of learners is fostered by three yearly professional development events, newsletters, Local Project Leaders, and graduated Green Schools mentors.

The evaluation team reviewed a large volume of aids to teaching and direct action that Green Schools provides its participants and judged many of these to be of high quality.

The evaluation team also identified gaps in the Green Schools materials and implementation with Edison schools.

The evaluation team found little evidence that Edison cross-markets its audit, incentive, and technical assistance programs for households and institutions to the participating Green Schools students, schools, or districts.

Conclusions

The Green Schools Program provides a comprehensive approach to school energy use, addressing at the school and district levels individual knowledge and behaviors, facility operations, and facility investments. The program appears to be quite successful in some schools and districts and less successful in others.

Opportunities exist to improve the effectiveness of the Green Schools program, most of which fall into two broad categories and are discussed below in *Recommendations*:



- Opportunities for the program implementer to make it easier for Green Teams to get up to speed faster than the current norm, to potentially attain higher performance, and to do so with less LPL support than currently provided.
- Opportunities for Edison to leverage the Green Schools Program by taking a strategic, comprehensive approach with participating districts that includes the provision of comprehensive energy efficiency services.

LivingWise®

Findings

The interviewed teachers are grateful the LivingWise® Program offers them a hands-on teaching resource and provides their students' households with conservation tools to which they might otherwise lack access. The teachers want to see the program continue and would like to teach the program to their students each year.

The evaluation team reviewed the LivingWise® instructional materials and found them to be of high quality with respect to many important criteria, such as coherent curriculum, aesthetic appeal, engaging interactive materials and exercises, effective delivery of conservation measures, suitability to a range of student abilities, clear presentation for students, ease of use by teachers, and effective processes geared toward program completion by teachers and program reporting by implementers.

Conclusions

The LivingWise® Program and materials have much to commend them. LivingWise® provides teachers and schools with a resource and conservation curriculum they would otherwise lack. It empowers students and their families to take actions to conserve resources and increases Edison's visibility as a leader in energy conservation among communities with school-age children.

The program implementer could improve the program by increasing the curriculum's alignment with California Department of Education content and instructional standards, and use of research-based best instructional practices, as well as by revising the *Pre- and Post-Surveys* to measure student knowledge with respect to key LivingWise® concepts and to the educational standards with which the curriculum correlates. (See *Recommendations*, below.)

Green Campus

Findings

Green Campus interns expressed a great deal of satisfaction with their experiences in the program. Both the intern survey and interviews with the program implementer demonstrated that



campus leads provide the interns with a great deal of information and support, which the interns value. The program also provides interns with a variety of professional development resources, ranging from formal career advice and networking sessions to the practical experience that interns gain as they carry out projects to promote energy efficiency on their campuses.

The goals interns set for the Green Campus Program at their universities and the projects they carried out were largely consistent with the overall goals set by the program implementer. Survey results showed that interns gave the greatest importance to projects directed at students, whether these projects were designed to raise awareness or achieve direct energy savings. In addition, the majority of the goals interns expressed for their campuses and the majority of the projects they carried out sought to influence the behavior of students.

During the 2006-2008 program cycle, the Green Campus Program took significant steps to improve its reporting processes. Working with Edison's program manager, the program implementer began reporting energy savings and other metrics in ways that better allow for tracking program performance over time on each campus, and that are more conducive to measuring the impact of the program as a whole.

As the Green Campus program has transitioned to be a non-resource program under the Statewide Workforce Education and Training Program, the program implementer has taken steps to increase the program's focus on education and professional development.

Conclusions

The Green Campus Program appears to be making effective use of student interns. Green Campus interns appear highly involved in the program and enthusiastic about its objectives. Interns conduct numerous projects each year geared toward increasing awareness of energy efficiency opportunities among students, faculty, staff, and administrators, and in acquiring energy savings through direct action.

Through campus leads, the program implementer has been able to provide interns with the guidance and support that they need to carry out their projects. The close relationship between campus leads and interns also allows the program implementer to monitor intern performance and ensure that intern teams are making progress toward their goals.

Overall, the Green Campus Program is well positioned to build awareness of energy efficiency and achieve direct energy savings at the universities where it operates, while at the same time contributing to the preparation of interns and other students for careers in energy efficiency-related fields. The evaluation also concludes that opportunities exist to strengthen the program (see *Recommendations*, below).



SUMMARY OF RECOMMENDATIONS

Status Reporting and Performance Indicators

The EARTH Schools program manager and the implementation contractors should collaborate to revise program reporting formats, as no parties are satisfied with the current reports. Along with narrative information, the status reports should include performance indicators.

The evaluation, in keeping with its research objectives, identified possible performance indicators for each program. The performance indicators are derived for each program from its logic and include measures of market penetration (numbers of participants by type), program activity outputs, and continuous improvement activities. The performance indicators also include program outcomes, which are typically assessed through impact studies. For Green Schools, the recommendations include suggested questions that might be posed to students to assess learning and attitudinal and behavioral changes. For LivingWise[®], the recommendations include suggested revisions to the *Pre-* and *Post-Surveys* the program currently uses to assess outcomes with participating students.

Program Educational Materials and Activities

Based on recognized best practices in education, as well as California Department of Education Requirements for both content and educational practices, the evaluation offers recommendations to Green Schools and LivingWise[®] to enhance and improve their educational materials and activities. The recommendations for Green Schools would make the lesson plans more accessible to faculty beyond the Green Teams. The recommendations for LivingWise[®] provide concrete suggestions for engaging the students in analysis and synthesis.

For both programs, the evaluators recommend that the programs provide teachers with additional methods for assessing student understanding of and engagement with the materials. Assessment is a best practice in education because it functions in a formative role – being a tool that can promote increased understanding, as well as in a summative role – as a tool for grading.

Effectiveness of Green Teams and Intern Teams

One of the strengths of both the Green Schools and Green Campus programs is the flexibility it offers its Green School teams and Green Campus interns to respond to the unique conditions of their school communities. This flexibility is supported by a wealth of resources the programs make available, as well as dedicated program staff time to work with the Green Teams and intern teams.

However, this flexibility comes at a cost, which is especially evident among the less active Green Teams. The cost is that each team needs to find their own way – with the assistance of program staff – through the many opportunities the programs provide. While for some teams this



approach appears to present no problems, other teams have difficulty gaining traction. And for all teams, program implementation requires substantial program staff support.

The evaluation offers detailed recommendations for organizing the Green Schools materials to better facilitate their uptake by Green Teams. The recommendations also include a suggestion to develop and offer a *Green Schools Program Guide* that includes options approaching “turn-key” implementation to assist Green Teams that find themselves hampered at the outset of their involvement by lack of time to tackle planning for what they perceive to be an amorphous undertaking.

The evaluation offers a recommendation to Green Campus that it build on efforts initiated in 2007-2008 that identify and describe *core portfolio projects* for the intern teams to consider implementing at their campuses. The evaluation team learned subsequent to the issuance of the draft report that the implementation team had in the interim expanded its core portfolio to include eight projects, as well as best practices related to conducting energy audits and integrating energy efficiency into the academic curriculum. The evaluation recommends that this activity be continued and that projects comprising the core portfolio be updated over time.

The evaluation also offers additional recommendations for the Green Schools and Green Campus programs regarding disseminating best practices via their websites.

Edison Leveraging of Program Activities

All three programs offer Edison opportunities to leverage program participation into additional program uptake and efficiency actions. All of the programs try to acquaint participants with other Edison program offerings. The Green Schools and Green Campus programs provide Edison with unique opportunities because of their comprehensive approaches. These programs aim to change both attitudes and behaviors, and to change them at the level of facility users, as well as facility owners. Consequently, these programs offer multiple pathways whereby Edison customer account managers, its Customer Technology Application Center, the EARTH Schools program manager, and Edison executives might be able – depending on the circumstances – to provide schools districts and universities with additional impetus toward energy efficiency. The evaluation makes recommendations relating to such leveraging of program activities.

Websites

The evaluation provides recommendations for each program’s website, based on the best practices outlined in the methodology. The evaluation offers detailed recommendations for the Green Schools and LivingWise® Program websites and a general recommendation for the Green Campus Program website, which the evaluators reviewed only cursorily.



Further Research

The evaluation offers recommendations for additional research, identifying program-specific issues for which additional research would improve Edison's understanding of the program and potentially suggest additional opportunities for program improvement.



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INTRODUCTION

This report presents the findings of a process evaluation of the 2006-2008 EARTH Education & Training Program (formerly called the Integrated School-Based Program – ISBP) conducted by Research Into Action, Inc. for Southern California Edison (Edison) and funded through the public goods charge (PGC) for energy efficiency. The study is available for download at www.calmac.org.

The 2006-2008 EARTH Education & Training Program (EARTH Schools Program) consists of three distinct component programs: *Green Schools*, *LivingWise*[®], and *Green Campus*. These three efforts provide energy conservation education to students K-12 through college/university. Each effort is implemented by third-party implementers hired by Edison: Resource Action Programs[®] (RAP) implements *LivingWise*[®]; and the Alliance to Save Energy (ASE) implements both the *Green Schools* and *Green Campus* programs.

Assisting Research Into Action in this work is Ms. Toni Lee Hanson of Educational Consulting Services, a science curriculum specialist.

Each of these three programs has been subject to at least one process evaluation and program effects study since its introduction to California investor-owned utility (IOU) customers. This prior research enabled the current process evaluation to focus on areas of specific interest to Edison as it continually seeks to improve its programs.

At the time of this process evaluation, impact evaluations of the three individual programs were being conducted in the Specialized Commercial contract group for the California Public Utility Commission (CPUC) to estimate the programs' net energy savings, as well as to identify any resulting recommendations relating to program design and implementation. Research Into Action coordinated with the impact evaluation team for these programs (KEMA, Inc. and its subcontractor, The Cadmus Group, Inc.) to collect information through impact survey efforts that was pertinent to the process evaluation, creating synergies between the two efforts and enhancing the overall quality of the research.

The evaluation team provided the Edison EARTH Schools program manager with a draft of this process evaluation several months in advance of the report's finalization, enabling the manager to address the report's recommendations in the program implementation plan (PIP) for the 2009-2011 EARTH Schools Program.



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RESEARCH OBJECTIVES

This process evaluation considered program activities for the academic years 2006-2007 and 2007-2008, and addresses the following key objectives of interest to Edison as it pursues continual program improvement. The evaluation:

- ➔ Identifies success factors and barriers to performance among schools participating in the Green Schools and LivingWise[®] Programs;
- ➔ Examines the roles of the Green Schools' Local Project Leaders and identifies opportunities to improve their effectiveness;
- ➔ Assesses the lesson plans for the Green Schools and LivingWise[®] Programs with respect to California educational standards;
- ➔ Assesses all instructional materials – including websites – for the Green Schools, LivingWise[®], and Green Campus programs with respect to best practices in education, in energy efficiency training programs, and in websites; and
- ➔ Offers recommendations for program status reporting and delineation of key performance indicators, including measures of educational effectiveness.

In addition to meeting the research objectives and providing recommendations for continuous program improvement, the study enumerates criteria for assessing educational materials, curricula, and websites.

The remainder of this chapter is organized as follows:

- ➔ EARTH Schools Program Overview
- ➔ Upcoming Program Changes
- ➔ California Public Utility Requirements
- ➔ California Department of Education Requirements
- ➔ Evaluation Framework
 - Best Practices in Curriculum and Instruction
 - Best Practices in Energy Efficiency Education and Training Programs
 - Best Practices in Website Design and Content
- ➔ Organization of the Report

The sections on best practices and California requirements provide the assessment criteria the evaluation team used in their analyses of the EARTH Schools Program.



EARTH SCHOOLS PROGRAM OVERVIEW

According to the Program Implementation Plan (PIP) for the CPUC's 2006-2008 program cycle, the EARTH Schools Program (then called ISBP) addresses the needs of schools through a combination of student, teacher, and school administrator education programs; it also increases awareness and knowledge of energy efficiency and water conservation, and what each individual can do to make a difference.

Innovations in the 2006-2008 approach from previous implementation plans included: combining the three separate programs (LivingWise[®], Green Schools, and Green Campus) into a single comprehensive education program; seeking natural gas and water savings in collaboration with Southern California Gas Company and regional and local water agencies; and incorporating utility and water programs with services to encourage the adoption of energy efficiency, demand response, and renewable energy and water conservation options.

For the 2006-2008 cycle, the EARTH Schools Program is classified as a residential resource program with energy (kWh) savings goals. This cycle spans the 2006-2007 through 2008-2009 academic years.

The EARTH Schools Program Manager and his supervisor, Edison's Residential Energy Efficiency Programs Manager, both emphasize that while Edison's responsibility is to address electricity use, the EARTH Schools Program addresses all forms of energy use, as well as that of water. Overall, the program seeks to educate students about resource conservation to influence attitudinal and behavioral changes that lead to greater energy conservation among students and their families and the broader community in which they live.

The Edison program manager describes the EARTH Schools Program name as an acronym: *E* is for *Educate*; *A* is for *Action* (behaviors) and *Attitudes* – which need to change to conserve earth's resources; *R* is for *Responsibility*; *T* is for *Teamwork* – we can't address the problems alone; and *H* is for *Home* – energy conservation starts at home and extends outwards to our communities, including those in the classroom and school.

UPCOMING PROGRAM CHANGES

Looking ahead, the EARTH Schools Program classification will change in the 2009-2011 program cycle, when it will be under the Statewide Workforce Education & Training Program (a core program), as described in the program PIP. The core program includes three subprograms; the EARTH Schools Program falls under the subprogram *WE&T Connections*. *WE&T Connections*, in turn, comprises three components: the Green Schools and LivingWise[®] Programs fall under the *WE&T Connections* component *K-12 Sector/ Communities*, while the Green Campus program falls under the component *College and University*. The EARTH Schools program manager will also be responsible for the PEAK Student Energy Actions program, a non-resource program that also falls under *WE&T Connections*.



CALIFORNIA PUBLIC UTILITY REQUIREMENTS

The *California Energy Efficiency Strategic Plan* articulates the state’s goal of workforce education and training.¹ The *Strategic Plan* identifies educational sectors and long-term goals; those relevant to the EARTH Schools Program are shown in Table 1.1.

As an Edison program manager phrased it, the California investor-owned utilities are charged with working with governmental, educational/institutional, and nonprofit organizations to prepare students for “green jobs that we as yet don’t even know exactly what they are.” Programs such as EARTH Schools are intending to stimulate interest in the fields of energy efficiency and environmental conservation, and to ensure students wanting to work in the field of energy efficiency or environmental conservation will have the right early foundation.

Table 1.1: Workforce Education and Training Strategies

SECTOR	LONG-TERM GOAL
Kindergarten through High School (K-12)	All California K-12 districts provide energy and environmental curriculum. Some students leave the K-12 educational sector with a desire to work in an energy or environmental capacity. Most students incorporate energy efficiency into their daily lives.
Minority, Low Income and Disadvantaged Communities	These communities are targeted for and have a high degree of participation and graduation from training and education programs addressing various levels of the demand side management (DSM) and the energy efficiency industry, including management, technical, engineering, and contractor careers. Individuals from low-income situations have taken advantage of apprenticeship programs that specialize in energy disciplines and have successfully advanced themselves into rewarding careers in these disciplines.
Four Year and Graduate Colleges and Universities	All university and college education programs offer degree program tracks that incorporate financing and energy economics, energy management, and/or technical (e.g., engineering) tracks.

The Green Schools and Green Campus programs will no longer be classified among Edison’s resource programs, while LivingWise[®] will continue its designation as a resource program.

The 2009-11 EARTH Schools Program contracts will include performance requirements to ensure that Edison will be able to demonstrate to its stakeholders program effectiveness and continuous improvement. Edison, like all the investor owned utilities, is seeking to meet aggressive program goals; therefore, metrics appropriate to the programs’ objectives which demonstrate effectiveness and continuous improvement will be a critical requirement for the success of the EARTH Schools Program. These metrics, or key performance indicators, will also help the program team to work together in partnership with the program implementers to monitor

¹ *California Energy Efficiency Strategic Plan*, June 2, 2008, CPUC Rulemaking 06-04-010, www.californiaenergyefficiency.com.



program performance on a more regular basis to identify opportunities for improvement and program impact.

CALIFORNIA DEPARTMENT OF EDUCATION REQUIREMENTS

Part of the EARTH Schools Program mission is to provide educational instruction on energy conservation that is in alignment with the state standards in California for K-12 curricula. Such alignment is critical for teacher and district acceptance of the programs.

In 2004, the California Department of Education developed the *Science Framework for Public Schools Kindergarten through Grade 12 with New Criteria for Instructional Materials*.² The evaluation criteria for instructional materials were later modified slightly for an *Education and the Environment Initiative (EEI)*.³ The California state instructional materials evaluation criteria provide the evaluation team with a foundation for acknowledging the strengths of the EARTH Schools Program's materials and provide recommendations for continued improvement in program alignment with California state requirements in the following five categories:

- ➔ **Science Content / Alignment with Standards (Category 1):** Science instructional materials must support the teaching and learning of the California Science Standards in accord with the guidance provided in the California Science Framework.
- ➔ **Program Organization (Category 2):** The sequence and organization of the science program provide structure to what students should learn each year and allow teachers to convey the science content efficiently and effectively.
- ➔ **Assessment (Category 3):** Instructional materials should contain strategies and tools for continually measuring student achievement (i.e., what students know and are able to do).
- ➔ **Universal Access (Category 4):** The instructional materials must provide resources and strategies to enable the effective teaching of students with special needs, including students with disabilities, students whose achievement is either significantly below or above that typical of their class or grade level, and students with special needs related to English language proficiency, allowing them full access to the rigorous academic content specified in the California Science Standards.

² *Science Framework for Public Schools Kindergarten through Grade 12 with New Criteria for Instructional Materials*. ISBN 978-0-8011-1599-8. Chapter 9, pages 300-307. © 2004 California Department of Education 1430 N. Street Suite 3207, Sacramento, CA FAX 916-323-0823. <http://www.cde.ca.gov/ci/cr/cf/documents/scienceframework.pdf>

³ See: *Evaluation Criteria for Education and the Environment Initiative Instructional Materials*. www.cde.ca.gov/ce/ee/eeievalcriteria.asp. Note that to date the EEI has included very little on energy and energy efficiency, and what is included addresses only grade 6. However, the evaluation criteria themselves provide a general framework useful to the evaluation team in structuring its assessment of the Green Schools materials.



- **Instructional Planning and Support (Category 5):** Instructional materials must contain a clear roadmap for teachers to follow when planning instruction (typically including a separate edition specially designed for use by the teacher) that enable the teacher to implement the science program effectively.

EVALUATION FRAMEWORK

The evaluators established a framework to govern this evaluation that draws on best practice studies in curriculum and instruction, in energy efficiency education and training programs, and in website design and content. By comparing the programs to established best practices, the evaluation identifies program strengths and opportunities for program improvement along three dimensions: curriculum and associated instructional methods; educational materials; and program processes.

Best Practices in Curriculum and Instruction

Educational researchers Robert J. Marzano, Deborah J. Pickering, and Jane E. Pollock at Midcontinent Research for Education and Learning (McREL)⁴ analyzed hundreds of selected studies on instructional strategies that could be used by teachers in K-12 classrooms.⁵ They used a research technique referred to as *meta-analysis*, which combines the results from a number of studies to determine the average effect of a given technique.

When conducting a meta-analysis, a researcher translates the results of a given study into a unit of measurement referred to as an effect size. An effect size expresses the increase or decrease in achievement of the experimental group in standard deviation units. An effect size of 1.0 translates into a percentile gain of 34 points. One of the primary goals of the McREL study was to identify those instructional strategies that have a high probability of enhancing student achievement for all students, in all subject areas, and at all grade levels. *Classroom Instruction that Works*,⁶ published in 2001, details the research findings and elaborates on nine categories of instructional strategies that have strong effects on improving student achievement.

Table 1.2 summarizes nine educational strategies the McREL study identifies as particularly effective in improving student achievement.

⁴ Midcontinent Research for Education and Learning (McREL) <http://mcrel.org/>.

⁵ For a detailed description of that effort, see Marzano, R. J. (1998). A theory-based meta-analysis of research on instruction. Aurora, CO: Mid-Continental Educational Laboratory (McREL). [ERIC Document Reproduction Service No. ED427087]

⁶ *Classroom Instruction that Works*. Marzano, Robert J., Pickering, Deborah J., & Pollock, Jane E., © 2001 McREL. Publisher: The Association for Supervision & Curriculum Development (ASCD). ISBN 0-87120-504-1 1703 N. Beauregard Street. Alexandria, VA 22311-1714 1800-933-2723 <http://www.ascd.org>.



For the EARTH Schools Program, the evaluators will reference the nine instructional strategies in acknowledging the strengths of, and providing recommendations for continued improvement in the design of the EARTH Schools educational materials and experiences for K-12 students. The evaluation team does not mean to imply that each of the instructional strategies should appear in every lesson; rather, one would expect a variety of experiences to be provided and the strategies to be used throughout the educational materials.

Table 1.2: Effective Educational Strategies

STRATEGY	EFFECTIVENESS	KEY INSTRUCTIONAL FEATURES
Identifying Similarities and Differences (pages 13-28)	<i>Effect Size: 1.61</i> <i>Gain in Student Achievement: 45%</i>	Students receive explicit guidance in, and are given independent opportunities to identify similarities and differences, which are represented in graphic or symbolic form, and used in comparing, classifying, and creating metaphors and analogies.
Summarizing and Note Taking (pages 29-48)	<i>Effect Size: 1.00</i> <i>Gain in Student Achievement: 34%</i>	The structure of information is made explicit and students are taught to selectively delete, substitute, keep, and analyze information. Teacher provides own notes so that verbatim note taking is minimized and a variety of formats for notes are used (e.g., informal outline, webbing, combination technique).
Reinforcing Effort and Providing Recognition (pages 49-59)	<i>Effect Size: 0.80</i> <i>Gain in Student Achievement: 29%</i>	Students are taught about effort and realize the importance of believing in effort. Students learn to change their beliefs to an emphasis on effort and systems of keeping track of effort and achievement are used (e.g., rubrics, data charts). Rewards are personalized and contingent upon the attainment of some standard of performance. Abstract symbolic recognition is primarily used with some tangible concrete symbols of recognition that support students' intrinsic motivation.
Homework and Practice (pages 60-71)	<i>Effect Size: 0.77</i> <i>Gain in Student Achievement: 28%</i>	A homework policy is established and communicated and assignments clearly articulate the purpose and outcome. Homework quantity is appropriate to grade level. Collected homework is commented on, feedback is given through a variety of approaches, and parent involvement is kept to a minimum. Teachers plan curriculum to increase students' understanding of how a skill or process works and engage students in mastering skills through practicing complex, multistep skills/processes, focusing on one aspect at a time, and adapting or shaping what they are learning.
		Continued



STRATEGY	EFFECTIVENESS	KEY INSTRUCTIONAL FEATURES
Nonlinguistic Representations (pages 72-83)	<i>Effect Size: 0.75</i> <i>Gain in Student Achievement: 27%</i>	Students engage in a variety of classroom activities creating nonlinguistic representations which elaborate on their content knowledge. Students experience using graphic representations and organizers that illustrate patterns, sequences, cause and effect relationships, generalizations, complex processes, and concepts. Students have opportunities to make physical models using various materials, experience generating mental pictures using various techniques, create symbolic representations for abstract content, draw pictures and pictographs, and engage in kinesthetic activities, such as drama.
Cooperative Learning (pages 84-91)	<i>Effect Size: 0.73</i> <i>Gain in Student Achievement: 27%</i>	Cooperative learning is applied consistently and systematically, but not overused. Cooperative groups are kept small in size and a variety of criteria for grouping students is used (e.g., interest, alphabetical), with minimal use of grouping by homogenous ability levels. Effective groupings give students enough time to thoroughly complete an academic assignment and experience the growth possible in cooperative work, (e.g., individual and group accountability).
Setting Objectives and Providing Feedback (pages 92-102)	<i>Effect Size: 0.61</i> <i>Gain in Student Achievement: 23%</i>	Instructional goals are specific but flexible. Students are encouraged to personalize the teacher's goals and develop contracts for attaining specific goals. Feedback is timely, corrective in nature, and specific to a criterion (e.g., content and process rubrics or checklists) that is clear to students prior to completing the work. Students effectively provide some of their own feedback and have opportunities for self-reflection.
Generating and Testing Hypotheses (pages 103-110)	<i>Effect Size: 0.61</i> <i>Gain in Student Achievement: 23%</i>	A variety of structured tasks guide students through generating and testing hypothesis, (e.g., Systems Analysis, Problem Solving, Historical Investigations, Invention, Experimental Inquiry, and Decision Making). Hypotheses generation and testing is approached both inductively and deductively and teachers ask students to clearly explain their hypotheses and conclusions.
Cues, Questions, and Advance Organizers (pages 111-122)	<i>Effect Size: 0.59</i> <i>Gain in Student Achievement: 22%</i>	Cues and questions focus on what is important as opposed to what is unusual, elicit inferences about things, people, actions, events, states of being, and require students to analyze and critique the information presented to them. Advance organizers focus on what is important by skimming for organization and the main idea. "Higher level" advance organizers produce deeper learning than the "lower level" advanced organizers and different types of advance organizers (e.g., expository, narrative) produce different results.



Best Practices in Energy Efficiency Education and Training Programs

The California Public Utility Commission directed a study of best practices associated with various types of energy efficiency programs.⁷ The best practices for nonresidential education and training programs provide relevant insights on best practices for the EARTH Schools Program:⁸

- ➔ **Develop a program plan with a program theory that describes the learning objectives and expected outcomes.**
- ➔ **Defining and targeting desired behavioral outcomes results in more powerful program effects.** Defining the desired behavioral and learning objectives during the curriculum development process helps focus training content on the most important topics. Specificity is important in measuring behavior change.
- ➔ **Employ curriculum and content experts and have them work together to assure that the information is presented in an effective format for learning.** Sound pedagogical practices must be built into training materials to ensure that lessons and information are meaningful and communicated effectively.
- ➔ **Train the trainers to improve the quality and consistency of trainings.** By improving the skills of trainers (for example, school teachers, project leads) and clarifying the expectations of the sponsoring organization, trainers will more effectively and consistently deliver the training content. Regular communication opportunities also offers opportunities for continuous improvement and feedback as trainers compare experiences and discuss successful or unsuccessful practices. Curriculum experts and others with knowledge of the learning process should be involved with training new trainers.
- ➔ **Identify the key data required to track and accurately report program activities and success indicators early in the program process;** be prepared to adjust databases as refinements become clear. Carefully document the tracking system.

⁷ *Best Practices Benchmarking for Energy Efficiency Programs.* The study is conducted by prime contractor Itron, Inc. and managed by Pacific Gas and Electric Company, under the auspices of the California Public Utilities Commission, in association with the California Energy Commission, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. www.eebestpractices.com.

⁸ The evaluators extracted the following list from *the Executive Summary of National Energy Efficiency Best Practices Study, Volume 02 – Nonresidential Education and Training Best Practices Report*, Itron, Inc., August 2008. www.eebestpractices.com/pdf/Nonres_Educ_Train_BP_Report.pdf. Note that the study addresses adult education and training, yet many of the identified practices appear to the evaluation team to be equally applicable to K-12 and college energy efficiency education programs.



Best Practices in Website Design and Content

The evaluation team used the website evaluation criteria listed below to review the Green Schools, LivingWise[®], and Green Campus websites. The team selected these criteria based on a comprehensive review, analysis, synthesis, and simplification of website evaluation criteria used by the American Library Association,⁹ Dr. Alice Christie's *AzTEA Arizona Technology in Education Alliance Exemplary Website Awards* evaluation rubric,¹⁰ the National Endowment for the Humanities' *EDSITEment: Web Selection Criteria*,¹¹ and the Oracle ThinkQuest Educational Foundation's *ThinkQuest Website Evaluation Criteria 2009*.¹²

The website evaluation categories include: *Organization, Presentation, Philosophy and Academic Standards, Audience, Educational Program Information and Content, Curriculum, Technical Aspects, Media Use, Written Language Mechanics, Sensitivity, and Originality*. As with any set of evaluation criteria, not all criteria will apply in every situation. It is possible that specialized websites might address some of these criteria very effectively, while not addressing other elements of the criteria. This set of criteria was selected to cover the scope of possible attributes and provide a lens by which evaluators could compare across the three EARTH Schools subprograms.

→ Organization

- The site's design and layout make it easy to use.
- Every page is visually well organized.
- The content organization holds the reader's attention and eases transition between sections.
- The home page provides a site map or logical structure for exploring an area of interest.
- The site allows for an active, constructive relationship to the content (e.g., search, blog, forum, wiki).

⁹ ALA American Library Association *Great Websites for Kids Selection Criteria*. ALA 50 E. Huron Chicago, IL 60611 Call Us Toll Free 1-800-545-2433
www.ala.org/ala/alsc/greatwebsites/greatwebsitesforkids/greatwebsites.cfm.

¹⁰ Dr. Alice Christie's *AzTEA Arizona Technology in Education Alliance Exemplary Website Awards* evaluation rubric. See <http://www.west.asu.edu/achristie/webaward/rubric1.html> and <http://www.west.asu.edu/achristie/webaward/rubric.html>.

¹¹ National Endowment for the Humanities *About EDSITEment: Website Selection Criteria*
http://edsitement.neh.gov/about_criteria.asp.

¹² Oracle ThinkQuest 2009 *Website Evaluation Criteria*
<http://www.thinkquest.org/competition/website/evaluation.html>.



- Contact information, name of the site, and a revision date are provided on each page.

→ **Presentation**

- The website is clearly identified and found easily through a key word search.
- The overall layout is clear and easy to follow.
- Content and program characteristics are provided in text and visually.
- Backgrounds and text work together, making it easy to read content.
- Graphical elements are used consistently.
- Colors, fonts, and layout are creative and artistic.

→ **Philosophy and Academic Standards**

- The purpose of the website is stated and evident in the content of the site.
- Academic content is linked to state standards.
- Links to sponsoring organizations are provided.
- Acceptable Use Policy for the site is clearly stated for all audiences.
- Copyright guidelines, permissions, and public domain notifications are followed.

→ **Audience**

- The needs and interests of the communities served are addressed.
- Relevant educational links are provided for the range of communities served.
- Program participants' work is featured.
- Program activities and projects are featured.

→ **Educational Program Information and Content**

- All content information relates to the overall educational purpose.
- Program content, processes, and policies are provided.
- Content is expertly presented, as evidenced by the depth of information and supporting details.
- Information is accurate, relevant, and valuable to intended audiences.
- A variety of information sources is used, including primary sources (e.g., interviews, surveys, personal observations, original artwork, and multimedia recordings).



- Sources are credible, credited, and citations are thorough enough to verify contents.
- Information is current (the site has been updated within the last two months).

→ Curriculum

- Teacher guides, lessons, and resources demonstrate quality instructional design criteria.
- Best practices of technology use in education are demonstrated.
- A full description of content/program curriculum is provided.
- A full description of outreach activities is provided.
- Unique characteristics of the content/program are clearly evident.
- The website intentionally stimulates local, national, and global awareness, presents action steps, and effectively engages others in addressing the issue and making a difference.
- Diverse viewpoints are provided with clear differentiation between opinion and fact.

→ Technical Aspects

- Printing or downloading documents is fast and easy.
- Links to related sites are appropriate and informative.
- Links are accessible and work effectively.
- Additional hardware or software plug-ins are available as needed.
- Graphics are optimized.
- Multimedia resources work properly.

→ Media Use

- Multimedia (e.g., images, audio, video, animation, games, interactive features, etc.) is used purposefully to enhance the presentation of information, engage the user more deeply, and demonstrate key concepts.
- Media elements (e.g., movies, photo essays, digital stories) include a concise written synopsis that deepens understanding of the topic.
- All media elements are essential components creating understanding or emotional impact.



→ Written Language Mechanics

- Writing is concise and easy to understand.
- Grammar and usage are correct.
- Punctuation and spelling are correct.

→ Sensitivity

- The website demonstrates awareness of and respect for the cultural diversity of the communities served.
- Language needs of the communities served are addressed.
- Sensitivity to the special needs of communities served is apparent.

→ Originality

- The website is creative and original in its approach to presenting the topic.
- Written content, photographs, artwork, and presentations are original work.
- The majority of content is not paraphrased or copied from outside sources.
- Website structure, design, and style are unique and original.
- The site has special features that attract or engage users.

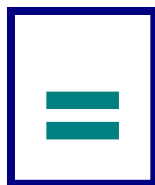
ORGANIZATION OF THE REPORT

Subsequent to this introduction, the report is organized into three sections: Section 1 addresses LivingWise[®]; Section 2 addresses Green Schools; Section 3 addresses Green Campus. Within each of the three sections, separate chapters provide a program background (including a description of the program and evaluation methodology), findings, and conclusions and recommendations.





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SECTION 1: GREEN SCHOOLS PROGRAM

CHAPTER 2: GREEN SCHOOLS PROGRAM AND PROJECT BACKGROUND

CHAPTER 3: GREEN SCHOOLS ASSESSMENT FROM INTERVIEW FINDINGS

CHAPTER 4: GREEN SCHOOLS RESOURCES ASSESSMENT

CHAPTER 5: GREEN SCHOOLS WEBSITE ASSESSMENT

CHAPTER 6: GREEN SCHOOLS REPORTING AND PERFORMANCE INDICATORS

CHAPTER 7: GREEN SCHOOLS CONCLUSIONS AND RECOMMENDATIONS



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2

GREEN SCHOOLS PROGRAM AND PROJECT BACKGROUND

PROGRAM DESCRIPTION

The Green Schools Program (Green Schools) is formally *The Alliance to Save Energy Green Schools Program: Empowering Schools through Energy Efficiency*.

The goals for Green Schools, as stated on the program implementer's website,¹³ are to “improve education through hands-on, real-world learning about energy and energy efficiency and strengthen schools by saving money on energy costs.” Implementation staff reported the two main objectives for the 2006-2008 program were:

1. Provide an action-based approach for integrating energy efficiency into the schools; and
2. Achieve energy savings.

When schools observe energy savings from their program activities, they are motivated to continue engaging in efficiency behaviors. The implementer terms this process one of “making energy efficiency both visible and valuable.”

The 2006-2008 Green Schools Program at Edison was a two-year program that started at the district level and enrolled up to 25 schools per district into the program at one time. As a two-year program, 25 new Green Schools are enrolled each year and the 25 schools enrolled the previous year continue as second-year schools within the Edison service territory. There is also a group of “graduated” schools – the Association of Green Schools.¹⁴

Green Schools supports school grades K-12 to: engage students in understanding issues relating to energy; raise awareness of the value of and methods for achieving energy efficiency throughout the school and the community; implement efficiency practices; establish baseline data on energy use; perform school energy audits; make recommendations for behavioral and technical changes; and monitor on-going energy use data. As part of these activities, Green Schools provides the Student Energy Audit Training (SEAT) to students at selected schools. For the 2006-2008 cycle, a goal was set to provide SEAT to three high schools a year.

¹³ Alliance to Save Energy website: <http://www.ase.org/section/program/greenschl>.

¹⁴ *Graduated Schools*, or schools that have completed two years of the program, may be eligible to join the Association of Green Schools. Note that a program change instituted prior to the 2008-2009 academic year in the number of schools that will participate for two years may have implications for membership in the Association of Green Schools.



Green Schools also supports schools with instruction resources. The Green Schools Program encourages student learning and leadership development using hands-on experiences in the real-world issues of energy efficiency and protecting the environment. Green Schools provides educational resources to schools, such as lesson plans, activity plans, and energy-auditing kits that include tools such as light meters, infrared thermometers, and watt meters. Green Schools' lessons are intended to be interdisciplinary, integrate into a teacher's regular curriculum, and correlate with state curriculum standards.

Most participating districts enter into an agreement with the program implementer to return a portion of the no-cost dollar savings back to the schools to support their Green Schools Programs (the remainder of the savings stays at the district level). According to the program implementer's estimates, Green Schools typically save about 5% to 15% on school electric costs.

A Green Team is established at each enrolled school, consisting of teachers, custodial staff, administrators, and students; teams receive a small stipend for carrying out the program. Green Teams attend an introductory fall workshop and create a customized *5-Strand Plan* focused on teaching about energy, saving energy in school, creating school-wide energy awareness, taking the message home and into the local community, and involving facilities staff in saving energy. Throughout the year, each school is supported by a Local Project Leader (LPL) who makes frequent school visits (typically once a month), communicates regularly via telephone and e-mail, and receives information on the school's monthly energy usage. School teams have access to energy-tracking information by going online.¹⁵ School teams come together again for a mid-year planning meeting in January and a celebration at the end of the school year.

Past student participants in Green Schools have made presentations to the school board on energy-efficiency retrofit recommendations, authored pieces for the local newspaper, and conducted energy audits for local small businesses. Most Green Schools in the 2006-2008 program cycle conducted CFL (compact florescent light bulb) Exchanges,¹⁶ which are reported by the Green Teams as one of their measures of success. The program implementer reported distributing 26,185 CFLs during the 2006-2008 program, and estimated households receiving the CFLs saved 2.1 million kWh per year, or approximately \$295,000 annually. This quantity of CFLs delivered compared with program goals of 5,000 CFLs a year.

¹⁵ At the fall workshop, team members are provided with oral and written instructions about how to work with the online software, and receive additional guidance as needed from the LPLs.

¹⁶ One Compact Florescent Light bulb (CFLs) is given free-of-cost to students who bring in an incandescent bulb (IB) and sign a pledge to use the CFL in their home. CFLs produce light by activating a florescent gas. CFLs fit into ordinary household light fixtures, use one-fourth the energy, and last 10 times longer than IBs. IBs produce light by passing electricity through a thin tungsten filament, which resists the flow of electricity and heats up, producing a glow. Only 2% of the electricity used in an IB actually produces light and 98% is lost as heat.



The program implementer also reported for Year 1 (academic year 2006-2007), participating schools had electricity savings of 1,819 MWh (8.4% of schools' usage) and bill savings of \$309,000. For Year 2, the implementer reported participating schools had electricity savings of 1,185 MWh (6.2% of schools' usage) and bill savings of \$202,000.

The program implementation contractor is, in fact, a team led by the Alliance to Save Energy, which holds the prime contract with Edison, and developed and manages the program (for Edison and, in independent efforts, for utilities around the country). The Alliance to Save Energy is supported in program implementation by Intergy Corporation, which, among other duties, provides the Local Project Leaders, and Utility Management Services, which has the key responsibility for estimating and tracking program energy savings.

Edison first began offering Green Schools in 2000. This evaluation assesses the program for the 2006-2008 program cycle, through the 2007-2008 academic year. The EARTH Schools program manager estimates that Green Schools has been offered, as of the 2007-2008 academic year, to approximately 10% of the schools in Edison's service territory.

The EARTH Schools program manager is a visible proponent of Green Schools in the Edison service territory, attending the fall workshops and end-of-year meetings.

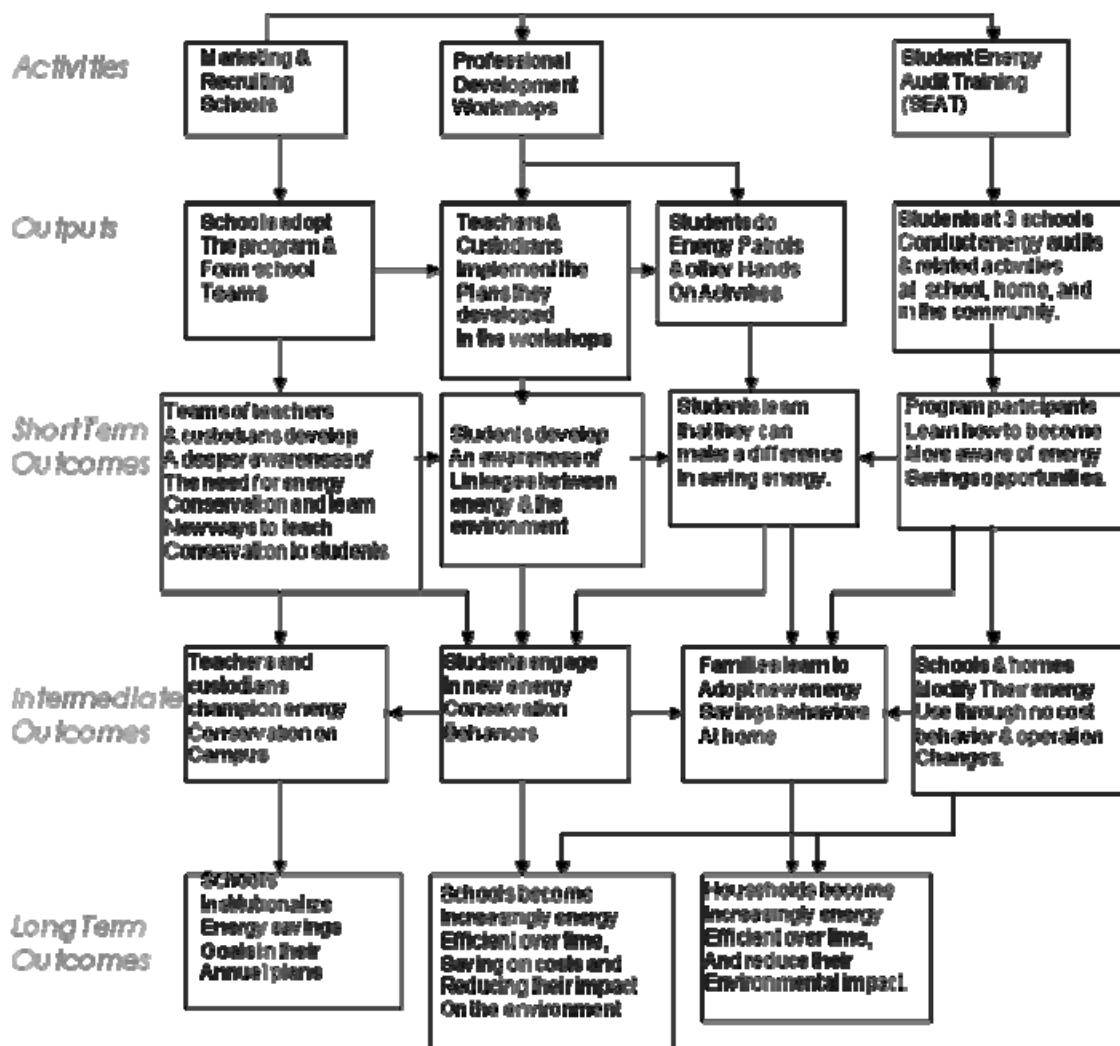
PROGRAM THEORY AND LOGIC MODEL

Edison evaluation staff developed a logic model and program theory for Green Schools in December 2007, prior to the launch of the CPUC impact evaluation for the program. The logic model is shown in Figure 2.1. The program theory document is given in Appendix A. Due to time constraints, program performance indicators for the logic model links were not developed at that time.

Both the logic model and program theory were developed in consultation with the program implementation management team and staff, as well as with the Edison program manager, and were approved by both parties as accurate representations of the program at the time they were developed.



Figure 2.1: Green Schools 2006-2008 Program Logic Model



UPCOMING PROGRAM CHANGES

The following changes are being made to the Green Schools Program for the 2009-2011 program cycle.

For the 2009-2011 cycle, the program serves the goals of the Statewide Workforce Education & Training Program (see Chapter 1, *Introduction*). As a consequence, Green Schools implementation at elementary, middle, and high schools will, in addition to its ongoing functions as implemented in 2006-2009, acquaint students with the job activities of and necessary preparation for careers in energy efficiency and renewable energy. No longer a resource



program, Green Schools will not be able to use Edison funding for CFLs and so will no longer have CFL Exchanges.

Also mentioned in Chapter 1, the contracts for the 2009-2011 EARTH Schools Program will include performance requirements. Edison will finalize the performance metrics after it receives CPUC approval of its Program Implementation Plan.

Among Edison's objectives for all of the EARTH Schools components, including Green Schools, are to increase the number of students served annually by the program, while reducing costs per school.

The program budget for the cycle is increased to a maximum of \$2,385,000, a 25% increase over the 2006-2008 cycle budget of \$1,907,000. Justifying this increase in budget, the program will serve 65 schools per year, a 25% increase over the current program cycle of 50 schools. Each year, participating schools will comprise 46 new schools, 16 schools participating for a second year (selected based on outstanding performance), and 3 mentor schools (which had formerly participated for two years). This composition represents an 84% increase in first year schools (from the current 25) and a 25% decrease in second year schools (from the current 25).

As with the current cycle, the EARTH Schools program manager must approve the school districts served; starting from the next program cycle, half of the schools served by the program must be in urban or inner-city areas. Although the EARTH Schools program manager states that no participants met this criterion as of the 2007-2008 academic year, the program implementer states that some schools were in the urban areas of San Bernardino. In addition, according to the implementer, most schools meet the WE&T criterion of serving "minority, low income, and disadvantaged communities" (see Table 1.1).¹⁷

The EARTH Schools program manager would like to see the program "touch as many districts and areas within Edison as we can. If we were to divide the service territory into ten quadrants, I'd like to see the program benefit all ten quadrants."

The upcoming contract for Green Schools will also include a clause that participating schools and school districts will be informed of Edison's nonresidential audit and incentive programs.

PRIOR PROGRAM EVALUATIONS

First offered by Edison in 2000, three prior evaluations have been conducted for the program:

- ➔ *2004-2005 Green Schools Program Evaluation (Program 1430-04, 1435-04, 1426-04)*, prepared by Quantec LLC for the CPUC Energy Division, August 3, 2006. Assisting

¹⁷ The implementer also reports staff have not received from Edison a definition of "urban or inner-city" and thus they are unable to precisely identify the number of participants to date in this category.



Quantec were Ridge & Associates, Equipoise Consulting, Inc., Shel Feldman Management Consulting, and Robin Walther.

- ➔ *Final Evaluation Report for The Alliance to Save Energy Green Schools Green Communities 2002-2003 School Programs*, prepared by Vanward Consulting, July 9, 2004. Assisting Vanward were Equipoise Consulting, Inc. and Ridge & Associates.
- ➔ *Southern California Edison Evaluation of 2000-2001 School Programs*, prepared by Ridge & Associates, August 31, 2001.

Key recommendations from the most recent of these reports (for the 2004-2005 program cycle) center on the following:

- ➔ Increase the percentage of schools submitting a monthly or quarterly report detailing the energy efficiency actions taken as part of their participation. Improve the report to enhance its clarity, specificity, and focus. Concentrate on only those changes created by the program and the activities that generate the greatest impact and are easily quantifiable [2004-2005 program report].
- ➔ Establish an on-site point-of-contact at each school to update school characteristics used in impacts modeling [2004-2005 program report].

EVALUATION OBJECTIVES AND METHODOLOGY

Objectives

Edison developed evaluation objectives that guided the development of the methodology and survey instruments. The evaluation study was designed to address the following research questions provided by Edison:

1. Assess the effectiveness of the Green Schools curriculum.
 - a. Assess the alignment of current Green Schools educational resources with California state educational standards, as this is critical for teacher acceptance of the program according to the program implementer.
 - b. Determine the extent to which teachers feel they have need for and access to, quality lesson plans from the program implementer.
 - c. What can be done to assess program educational effectiveness as defined by a change in students' attitudes and behaviors? Can relevant pre- and post-tests for students be developed?
2. What can be learned from currently high-performing and low-performing schools about success factors and barriers to achievement? The program implementer might then use these insights into the factors influencing success in recruiting and working with schools to increase the likelihood of high performance.



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3. Are there opportunities to increase the effectiveness of Green Schools Local Project Leaders?

Edison formulated the evaluation objectives to aid its continuous improvement efforts. Thus, this process evaluation falls in the category of formative evaluations. The evaluation is not intended to be summative, that is, an assessment of program outcomes and the degree to which the program attained its objectives.¹⁸

Impact evaluations are no longer in Edison's purview. The California Public Utility Commission conducted an impact evaluation of Green Schools concurrent with this process evaluation. The study was still underway at the time this report was finalized, with an anticipated publication date of late fall 2009. The current process evaluation did not validate the electricity and dollar savings claimed for Green Schools by the program implementer.

Methodology

To address the research objectives, the evaluation team conducted in-depth interviews in-person and by phone with program staff of Edison (the EARTH Schools manager and his supervisor) and the implementation contractor team, including two managers and two Local Project Leaders. These interviews occurred between May and August 2008.

The evaluation team also visited eight participating schools and interviewed one or more Green Team members, with the number determined by teacher and staff availability. Interview participants included eight teachers, one guidance counselor, one custodian, one school principal, and two district energy managers.

Site visits to eight schools constitutes a case study approach to the program evaluation. Edison wanted an in-depth look at small samples of high performing and low(er) performing Green Schools to identify success factors and barriers to success. The evaluation team worked with Edison and program implementation staff to identify ten schools in each category, for which site visits were scheduled with four high- and four low-performing schools. Low-performing schools in this context refers to schools that were not reaching their full potential as participants in the Green Schools Program.

¹⁸ According to William M.K. Trochim of Cornell University: "Formative evaluations strengthen or improve the object being evaluated – they help form it by examining the delivery of the program or technology, the quality of its implementation, and the assessment of the organizational context, personnel, procedures, inputs, and so on. Summative evaluations, in contrast, examine the effects or outcomes of some object – they summarize it by describing what happens subsequent to the delivery of the program or technology; assessing whether the object can be said to have caused the outcome; determining the overall impact of the causal factor beyond only the immediate target outcomes; and, estimating the relative costs associated with the object." <http://www.socialresearchmethods.net/kb/intreval.htm>.



The evaluation team selected the four schools to visit in each performance category from among the ten identified to comprise high/low pairs of: 1) large high schools; 2) small high schools or continuation high schools; 3) middle schools; and 4) elementary schools. These high/low pairs were selected with a consideration of school size, school district, Local Project Leader, test scores, percent of students eligible for free and reduced lunches (a socioeconomic indicator), percent of English-language-learners among the students, and years in the program. The sample of eight schools includes at least one school from each participating district.

Working within the constraints of the 20 high and low schools initially identified for the sample frame, and our sample size of eight schools, the evaluation team selected high/low school pairs to support an exploration of the extent to which the school characteristics used to create the sample affect performance. These characteristics were chosen based on hypotheses about what factors may impact school performance. For example, the socioeconomic characteristics of the school community were selected to determine if resource availability had an impact on program performance. The program manager was particularly interested in knowing whether the messages of “cost saving” and “save the environment” had differential appeal among the student body of schools with low and high socioeconomic indicators. English language ability was selected to determine if English proficiency might be a barrier to achievement in the program. And, finally, school and district size was selected to determine if there were size-related differences in capacity to implement the program. The program manager was particularly interested in knowing whether larger schools and districts offered the advantage of more resources and organizational capacity, or whether smaller schools were able to provide a more focused approach to the program based on a more intimate school environment.

The selected schools included four schools that had just completed their first year in the program, two schools that had completed their second year, and two graduated schools.¹⁹

In addition to these efforts, the process evaluation team wrote about a half-dozen questions to include in impact evaluation surveys being conducted for the program by The Cadmus Group, Inc. (Cadmus), working as a subcontractor to KEMA, Inc., who holds the prime contract with the CPUC to conduct impact evaluations for 2006-2008 programs the CPUC classified as Specialized Commercial, including the EARTH Schools Program.

The impact evaluation team fielded surveys of participating school custodians, teachers, and non-teacher decision-makers for an analysis of impacts. The impact sample plan specified sample sizes of 33 for the custodians, the teacher, and non-teacher decision-makers, providing levels of 90% confidence with 10% precision for the 65 schools participating in the program at

¹⁹ For the 2006-2008 cycle, program participation comprised two years. The two graduated schools in our site-visit sample were schools that completed the two-year program and are now active members of the Association of Green Schools.



the time of evaluation plan. The impact evaluation team fielded these surveys in the second quarter of 2008.

Six custodians completed the custodian impact survey; all six worked at elementary schools, including one school that was among the process evaluation sample frame of ten high-performing schools and one school that was among the sample frame of ten low-performing schools.

Twenty-two teachers and non-teacher decision-makers (i.e., principles and district administrators that made the decision to participate in Green Schools) completed the teacher or decision-maker impact survey. Four of these respondents worked at elementary schools (including one school in the high-performing sample frame), two worked at high schools (including one school in the low-performing sample frame), five worked at school district offices, and eleven did not provide information on affiliation.

Appendix H contains the survey instruments.

GREEN SCHOOLS SECTION ORGANIZATION

The report section on Green Schools comprises six chapters, Chapters 2 through 7. In addition to this chapter that provides a brief program description and the evaluation approach, Chapter 3 presents findings from interviews with Edison staff, Green Schools' program implementers, and Green Schools' participants. Chapter 4 provides a review and assessment of program instructional resources. Chapter 5 provides an assessment of the program website. Chapter 6 discusses program reporting and performance indicators, and Chapter 7 provides conclusions and recommendations.





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GREEN SCHOOLS ASSESSMENT FROM INTERVIEW FINDINGS

This chapter presents findings from interviews with Edison staff, Green Schools implementation staff, and Green Teams, organized into the following sections:

→ **Overall Participant Response to the Green Schools Program**

→ **Green Team Organization**

- Green Team Members
- Team Leader Characteristics

→ **Involvement of the School Community**

- Students
- School Staff
- Principal and School Administrators
- Communicating the Green Schools Initiative within Schools
- School Socioeconomic Considerations

→ **District Support**

- District Energy Manager
- Superintendent Support
- District Energy Policy
- District Share Back of Energy Cost Savings

→ **Edison Support**

→ **Local Project Leader Support**

→ **Training the Green Team**

- Fall Professional Development Workshop
- Planning Time
- Instructional Resources Guide and Support Materials

→ **School Audits**

- Student Energy Audit Training (SEAT)



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- Participant Recommended Changes to SEAT
 - Energy Audit Kit
 - Audit Process
 - Audit Outcomes
- **Community Outreach**
- CFL Exchange
 - Public Speaking
- Green Schools Links to Other Edison Programs
- **Monitoring, Reporting, and Continuous Improvement**
- Current Monitoring and Reporting
 - The Utility Manager[®] Software
 - Continuous Improvement
- **Findings from Impact Survey Efforts**
- Green Schools Custodian Respondents to Impact Survey for Custodians
 - Green Schools Teacher Respondents to Impact Survey for Teachers

Throughout the chapter, the text calls out implications from the findings, calling attention to success factors and barriers, and suggesting ways Edison or the program implementation staff might enhance program success. The more significant themes developed through these implications are called out clearly in Chapter 7, *Green Schools Conclusions and Recommendations*.

OVERALL PARTICIPANT RESPONSE TO THE GREEN SCHOOLS PROGRAM

Overall, interviewed participants consider the energy and environmental education promoted by the Green Schools Program to be valuable to student learning. Generally, respondents are optimistic about the potential of the program to increase energy awareness and savings within schools and across school districts.

Several school contacts report difficulty in achieving a high level of success in the program due to obstacles related to time, resources, training, and communication. These issues are discussed in the remainder of this chapter and include such factors as: participants' lack of time available to integrate Green Schools' educational resources into classroom lessons; their difficulty



implementing concepts presented at program training sessions; and the challenge of communicating program messages to the greater school community.

Based on an analysis of the high-performing schools compared to schools that were not reaching their full potential in the program, the following characteristics were identified as being most closely associated with successful program outcomes: Green Team leader characteristics; school principal and administrative support; enthusiasm at the school district level and corresponding support for the program, including the sharing of energy cost savings; and the support of the Green Team Local Project Leaders. Essentially, the single most important factor for the success of the program was the degree to which leadership at all levels involved with the program embraced Green Schools as program champions. This suggests the importance of selecting schools that have strong leadership and support for energy conservation pedagogy and practice, and the need to strengthen the commitment to conservation as a priority for schools that are not reaching their full potential.

In addition to identifying key success factors, the study also identified participants' experiences that highlight the program's many strengths and successes, as well as opportunities for both Edison and the implementation contractor to increase program effectiveness.

Subsequent sections discuss the findings underlying these assessments. Findings are summarized and interpreted in Chapter 7, *Green Schools Conclusions and Recommendations*.

GREEN TEAM ORGANIZATION

Green Team Members

Green Teams form the core implementation task force at each participating school. They are typically comprised of two teachers and one custodian, who attend trainings offered by the program and coordinate the Green Schools Program within their schools. Once formed, Green Teams recruit students and staff to help plan and implement the program on campus.

Program implementation staff recommend recruiting as many individuals as possible to help implement the program in schools, but tell the schools it works best when teams have as a core two teachers and the school custodian. Implementation staff added that schools are free to add more teachers, the principal, parents, and student leaders to the team as well. Implementation staff report that two or more teachers enable the team members to collaborate on ways to integrate energy efficiency into the classroom, the school, and the community. Custodians are the most knowledgeable of school staff on how energy is being used (and wasted) in schools, observe lights and equipment that remain on after the school day, and know when the school is in use by community groups.

Although the program implementer recommends teams of two teachers and the custodian, several interviewed team leaders had the understanding that a three-member team was a requirement. Respondents from two of the eight schools interviewed believe that expanding the



number of members on their Green Team would make their programs more effective. According to a team leader from a high-performing elementary school with a three-member team, “The Green Team would work better with four to five staff, or one member for each grade.” When asked whether she would consider adding more members to the team, this respondent replied, “We thought Green Schools said it had to be three people.”

→ **Implication: Participants appear to be confused as to whether they are empowered to create the Green Team that will work best for their school.**

Individual members of Green Teams vary from school to school. For instance, one respondent purposefully did not include a custodian on her team, but instead included the front office secretary. According to this respondent, “The secretary knows how to write letters and is familiar with financial information regarding the school, including how much energy we use, which made her really beneficial to have on my team.” The contact further elaborated, “You just need to include members who will provide the most benefit for the program.”

Green Team members are subject to change. In addition to school staffing turnover, a condition discussed further below, membership changes occur in response to the team’s increased understanding of how the program can most effectively be integrated into schools. For instance, one Green Team recently replaced a physics teacher with an engineering teacher because more opportunities were found to integrate Green School’s instructional materials into the engineering curriculum than into physics.

→ **Implication: A flexible approach to the Green Team composition appears to work well.**

Several contacts hold the view that including a custodian on the Green Team is crucial because custodians are able to ensure that appliances, lights, computers, and other equipment are shut down after school hours and before school vacations begin. According to one contact, unplugging everything before school vacations is “where we see the big drops in energy use.”

Contacts report that custodians can monitor equipment usage patterns and report information back to the Green Team for follow-up. Additionally, custodians often act as liaisons to district maintenance and operations staff, and work to initiate energy-efficient equipment upgrades.²⁰ Custodians also play a critical role in soliciting involvement in the program from the rest of their staff. Program implementation staff describe custodian involvement as a “unique” program component: “Rather than working in ‘silos,’ as is the norm, in Green Schools custodians, teachers, and students work together to involve the whole school in energy efficiency education and behavior.”

²⁰ Equipment upgrades are performed by the district. At the district level, the Director of Maintenance and Operations has direct responsibility and reports to the Assistant Superintendent of Facilities.



One respondent reported not including a custodian on her school's team because she felt the custodians at her school were already too busy. She further cited language differences as a barrier to inclusion of some custodians on the team. Another respondent reported that it is unrealistic to expect custodial staff to volunteer for the Green Schools Program and suggested that custodians should receive a stipend from the school district to reward their participation in Green Schools initiatives.²¹

→ **Implication: The program might benefit from a review of custodian involvement in Green Schools activities, an identification of benefits from and barriers to custodian participation, and the development of strategies to further custodian participation. This could be achieved through a brief survey of participating custodians and other Green Team members.**

Team Leader Characteristics

Respondents unanimously report that having a motivated team leader is essential for success. According to one respondent, "When you have motivation from one or two team members, it gets transferred to the others." Participants report teams are less likely to succeed when the team leader has been appointed by a school administrator and estimate that perhaps half of such teams are unproductive. Consistent with this assessment, two out of the four low-performing Green Schools interviewed are led by individuals that were appointed to the position.

Program implementation staff report that motivation alone is not enough for a team leader to achieve success in the program. According to one respondent, "Also important are the team leader's personality and history with students. Team leaders must have knowledge and willingness, but also rapport with students, and the ability to motivate and leverage student support."

Regarding the capacity to leverage support for the program, a district energy manager reported that the Green Teams for two schools within his district that are especially active are led by the school principals.²² According to this respondent, principals are ideal in the team leader position, because their position of authority allows them to generate support for the program.

The individuals best suited to lead a team appear to vary from school to school. For seven of the eight schools interviewed, Green Teams are led by teachers; one of the teams interviewed is led by a guidance counselor. This guidance counselor reports being particularly well suited for the leadership position because her team focuses on providing public outreach and, unlike teachers

²¹ Green Schools teachers and custodians are eligible to receive a stipend that rewards extra effort involved in implementing the program.

²² Note that the evaluation team did not interview the Green Teams referred to by the district energy manager.



at the school, she is free to transport student members to present at outreach events because she does not need to arrange for a substitute teacher.

School regulations, as well as policy, must be considered when selecting a team leader. For instance, a day custodian was initially selected to be the team leader at one school, but was replaced by a teacher because the school's policy prohibits custodians from meeting with students after school.

→ **Implication: Team leaders appear to be most effective when they embody a number of characteristics, including motivation to see the effort succeed, rapport with students, and leadership within the school – characteristics that are important to consider when school administrators select team leaders. Team leaders who are able to meet with students after school and to transport students to events that may occur during the school day also provide key support for program success.**

INVOLVEMENT OF THE SCHOOL COMMUNITY

Students

Respondents report that, while the initial motivation to inspire participation in the program should come from the Green Team, students often are more effective than staff members at recruiting students and other staff. According to respondents, recruiting additional students and staff is most easily achieved by first reaching out to students, who then become the key advocates for the program. This view was held by Green Team staff at schools serving all ages of students.

As a respondent from a high performing Green School explained, “It’s very simple. We motivated the kids first, and then the kids demanded that the teachers participate, and the teachers participated – because they want to do the right thing for the kids.” Similarly, a respondent from another high-performing Green School reported that “getting as many kids involved as you can” is vital to the success of the program.

Regarding what types of students to involve, a team leader from a high school emphasized the need to include a “mixture of students.” This respondent recommended including students who are likely to attend trade schools for taking measurements, students who excel in writing to record notes, and students who are naturally extroverted to present Green Schools’ messages before large groups.

Because many Green Schools activities involve meeting with students during after-school hours, respondents report that students’ after-school schedules need to be considered when selecting student participants. For example, the Green Team leader of a high school reported losing “half of my Green Team to spring sports.” The team leader plans to recruit “three-to-four separate groups of three-to-four students coming on different days.” Consistent with this approach, a team



leader from a high performing middle school reported having successfully addressed the issue of student availability by holding Green Team meetings on alternating days every other week.

- ➔ **Implication: Teachers need to respond creatively to students' schedules and Green Schools activities. High levels of engagement with students create a positive cycle of stimulation and interest across the campus.**

School Staff

A team leader from a low-performing Green High School reported difficulty monitoring energy usage school-wide, due to the relatively large size of the school. To address this, the respondent plans to recruit teachers in each academic department to help with the monitoring effort. The respondent also suggested increasing the energy management responsibilities for non-teachers at the school, such as theater technicians, who can ensure that theater lighting is shut off when not in use. (See the section *Audit Process*, a subsection of *School Audits*, below, which elaborates on the challenges teams at large schools face in monitoring energy usage school-wide.)

A barrier to involving staff – indeed, a barrier to Green Team activities in general – is a lack of facility knowledge.

- *“Participants need help from the district to know where the switches are and to understand what they are and are not allowed to do. Where is the electric meter? Where is the pool heater? Where are the shut-off valves and the switches for the stadium lighting and the pool heater? A lot of this stuff we have no idea about and can't get access to.”*

This contact suggested that one day be set aside during the school year, not only for Green Team program planning, but also for district staff to tour the campus with the Green Team in order to increase their overall understanding of the school's energy use and controls.

This contact requested additional clarification from the district regarding the appropriate contact person(s) that might provide assistance with implementation of various program components, as well as answer questions regarding the district's policies, procedures, and chain of command.

- *“We need to be able to either address an issue ourselves or be able to enlist the responsible party to be consistently responsible for that specific area. But you find there's a chain of command: 'this is not my area, you have to contact so-and-so.'”*
- ➔ **Implication: The program implementer should encourage districts to support Green Teams by: providing them with a point-of-contact at the district, helping them understand the district's policies, procedures, and chain of command; and augmenting their understanding of the school's energy use and controls.**



Principal and School Administrators

Respondents report that the program must have the support of the school principal to be successful. Consistent with this, each of the four low-performing Green Schools report limited support or involvement from their school principals.

→ **Implication: Limited principal support appears to be strongly correlated with low Green Schools performance.**

Contacts report that school principals who express initial skepticism regarding the program typically become supportive once they receive financial returns from energy savings. As one district energy manager explained, “The principals within our district were initially apprehensive, but when they got their first check, that all changed.” This contact further noted, “The more we saved, the more the schools got behind it. That’s what made the program work.”

Although the Green Schools Program strongly encourages all districts to share the resulting energy savings with participating schools and program staff by working with district administrators to establish a shared savings agreement, they are not required to do so; consequently, there are some districts in the program that have not established shared savings.

→ **Implication: The district’s sharing of energy savings with schools appears to be an effective means of ensuring principal support for Green Schools, which in turn is an element apparently critical to success. To increase program effectiveness, the program implementer should explore opportunities for establishing a business case for adopting the share-back feature of the program by documenting the important role it plays in program success in other districts. The EARTH Schools manager should support the program implementer in talks with reluctant districts.**

Respondents report that effective venues for principals to convey their support for Green Schools include staff meetings, school announcements, school-wide assemblies, and visits to individual classrooms. According to one respondent, “One of the things that really helped student motivation was that the principal dropped in for a very short period of time during Green Schools training and gave a pep-talk about the training and the program. It made the kids feel important.”

Participants report that teachers are generally required to participate in “adjunct duties” (bus duty, recess, etc.) in addition to their regular teaching responsibilities. Participants report that Green Teams are more likely to recruit and retain Team members when schools make Green Team participation an adjunct duty. According to one respondent, including Green Schools activities as an adjunct duty would appeal to teachers, because “instead of doing bus duty I could do green schools.” Furthermore, adding Green Schools participation as an adjunct duty would underscore the school administration’s support for the program.



- **Implication: Providing Green Team staff with the opportunity to substitute their adjunct duties for Green Team activities enhances the ability of team members to commit time to the program.**

Communicating the Green Schools Initiative within Schools

Several respondents report that school-wide Green Schools assemblies are an effective method of building familiarity and support for the Green Schools Program. A team leader from a high-performing elementary school holds two Green Schools assemblies each school year – one in the beginning of the year to introduce the program and one at the end of the year to highlight accomplishments. The contact considered holding the *Energy Hog Traveling Road Show*²³ at her school, but decided not to, because she considers the *Energy Hog* character in the show to be “too scary for elementary school kids,” adding, “if we bring him in, kids will associate energy efficiency with a scary monster.”

Several respondents report that teachers, students, and administrative staff are receptive to the Green Schools message when delivered by the school principal or district superintendent. One respondent plans to ask the principal of the school to come individually into each classroom to remind teachers and students to turn off lights, computers, and other equipment. The team leader of a high-performing middle school plans to ask the principal to deliver quarterly reports to staff regarding Green Schools’ accomplishments.

Respondents report success in communicating the Green Schools message in conjunction with official school announcements. For instance, the team from a high-performing Green High School created a two-minute infomercial describing the program. This infomercial is broadcast via the schools’ closed-circuit television system and loops continuously throughout the day, following school announcements.²⁴

Respondents report that posters and signs are effective reminders for students and staff to engage in energy-saving behaviors. A team leader from a high-performing Green Middle School reports that changing these signs frequently and adding bits of humor help to keep the Green Schools message noticeable and upbeat.

Contacts report that demerits can be effective in increasing compliance with Green Schools initiatives, but that contests and incentives are more effective in building support for the program among school staff. For example, following completion of energy audits, one team leader provides lists of recommended actions that each teacher can take to reduce energy consumption.

²³ The *Energy Hog Traveling Road Show* is an interactive school assembly program that teaches 3rd to 5th grade students about the sources of energy, how we waste energy, and how to conserve energy.

²⁴ Respondents report that closed-circuit television is a relatively new technology in schools and that many schools have not yet adopted it.



The contact reports that this method has produced positive results, but that “some teachers have taken offense to this.” According to the team leader of a high performing middle school, “It’s probably better to provide incentives than demerits.”

Respondents report that contests and incentives are also effective in building student support for the Green Schools Program. For example, the team leader of a high-performing elementary school reports tremendous success with a monthly contest that rewards classes that engage in energy-saving behaviors and documents this by coloring in sections of a picture of an energy-saving light bulb. The student volunteer from the winning class, or *watt-watcher*, wins a green wristband, Green Schools bag, or gift certificate.

Unfortunately, several program participants and program implementation staff report being low on supplies to acknowledge and reward students for Green Schools participation.²⁵

➔ **Implication: In addition to, and/or in lieu of purchasing recognition/award items, the program implementer should provide Green Teams with ideas for ‘no cost’ motivational rewards for students, such as opportunities to have lunch with the principal or other opportunities that are meaningful to the students, but require no additional cost to the school or the program implementers.**

School Socioeconomic Considerations

Responses were mixed regarding the relationship between schools’ socioeconomic status and success with the program. Two team leaders from schools with a high percentage of students on free and reduced lunches (92% and 64%, respectively) hold the view that schools with relatively high socioeconomic status are more likely to succeed with the program; yet their opinions are not based on programmatic experience with such schools. Program implementation staff and two interviewed district energy managers for districts comprised of schools spanning a range of characteristics suggested that districts with lower socioeconomic levels are more likely to be receptive to the program. One of these district energy managers reported that an elementary school in his district with a high percentage of students on free and reduced lunch programs is “performing three times better in the program than an elementary school in the same district with relatively high socioeconomic status.” (It is beyond the scope of this evaluation to validate this assertion by the energy manager.)

Contacts report that both environmental and cost-savings messages are increasingly compelling to both groups. However, contacts tended to believe that Green Schools messaging related to energy cost savings may be most compelling to students with lower socioeconomic status and

²⁵ Program implementation staff reported that they requested and secured a change order from Edison to purchase Green Schools recognition/award items. However, subsequent budget cuts limited the funds available for this purpose, especially in the 2008-2009 program year, the year after this evaluation period of 2006-2007 and 2007-/2008.



that messaging related to environmental stewardship may be more compelling to students with high socioeconomic status. A team leader from a Green Middle School with a low percentage of students receiving free and reduced lunches reported that students are particularly receptive to environmental messages related to global warming and reducing carbon emissions.

- **Implication: Leadership – at the school and district levels--was the only characteristic that was found to be a key success factor for overall school performance among all the schools across the socioeconomic spectrum. Due to the limited anecdotal evidence gathered, further research needs to be conducted to determine what role socioeconomic characteristics of the school population has on student motivations; specifically, whether students' household incomes suggest what messages students find most meaningful – cost savings opportunities, environmental stewardship, or both.**

DISTRICT SUPPORT

District Energy Manager

Contacts emphasize the importance of including district energy managers in the Green Schools Program because of their role in working to upgrade standard equipment and operations with energy-efficient equipment and operations. According to one program implementation staff, “We’ve learned that we needed to have the district energy manager in the program and that’s been quite successful. We didn’t have that component in the program before.”

Green Teams are capable of addressing behavioral changes at schools, but are typically not authorized to institute energy-efficient upgrades of existing equipment and have limited influence on district-level facilities operations. According to the team leader for a high-performing Green School, “We’ve done behavioral changes at the school, but when it comes to physical changes, we’re really at the mercy of district maintenance [department].”

- **Implication: District energy managers play a valuable role in Green Schools and should be engaged with the program as early in the process as possible.**

A district energy manager who has been successful with the Green Schools Program advised new energy managers to take the program one step at a time. According to this respondent, “Get the first piece in place and working, and *then* move to the second. Then get the second piece going, but don’t drop the first one. Expand the program *slowly*.” This respondent also emphasized that new district energy managers must gain a complete understanding of facilities’ equipment installation and operations.

The respondent continued by stressing the importance of maintaining communications with custodial staff and administrators at each site. According to this respondent, “Every day, regardless of how busy I am, I always make time to talk to one of the schools to find out what’s going on and see if they need anything.” The respondent recommended making personal visits,



noting that the same quality of interaction “just doesn’t happen over the phone.” Due to time constraints, this energy manager limits interactions to custodial staff and administrators, relying on the program implementation staff to assist Green Team members and teachers with program implementation.

A second district energy manager recommended conducting regular meetings with key district maintenance department staff, including the maintenance supervisor, the HVAC supervisor, and the energy management technician, and keeping formal notes. In addition, this contact suggested including at least one district staff who is a skilled communicator and another who is able to provide technical and maintenance support.

- ➔ **Implication: Strong leadership from district energy managers plays a strong role in the success of the program when they are supportive of program goals and activities. All other factors being equal, the EARTH Schools program manager and program implementers should consider the availability of a strong, supportive energy manager as a selection criterion for school participation.**
- ➔ **Implication: The program implementer should consider tapping into the enthusiasm and expertise of district energy managers that currently take an active role in Green Schools by enlisting them in a mentoring role for energy managers in nearby districts.**
- ➔ **Implication: The district energy managers with successful Green Schools programs recognize that success builds slowly. The program involves a lot of facets and it takes a district time to lay the groundwork. Identifying the steps for success taken by districts would benefit other schools and districts.**

Superintendent Support

According to a district energy manager, “What I’ve found is that to have this program work, you need the administration to back it.” The contact attributed the initial success of the Green Schools Program in his district to the fact that “the superintendents were one-hundred percent behind it.”

According to school contacts, school districts are most likely to respond positively to a message that stresses the behavioral focus of many Green Schools activities and that can be implemented at no cost. However, these claims do not fully reflect the scope of the Green Schools initiative. Green Schools intends to affect school facility energy use and the Green Schools team (both Edison and the implementation contractor) needs to convey to the district that district support – staff support, at a minimum, and possibly financial support to seize efficiency opportunities – is critical to the success of the program. The implementation contractor needs to be prepared to work with districts to increase – step-by-step as one district energy manager advised – their active support for energy efficiency. As one Green Team leader reported, “I think the district’s



ideal is to have the program run itself with no capital or human resource outlay – to not pull any weight. The district needs to step up to make this work.”

Regarding sustained district support, contacts report that when there is turnover among key district staff, program implementers must get a “re-commitment” from the district to ensure continuity of the program. Contacts believe that to ensure continued district support for the program, district staff must be kept informed of the progress of Green Schools initiatives.

→ **Implication: District commitment, like school commitment, is not a one-time event and needs to be fostered over time, especially when staff turnover occurs.**

Towards this end, a team leader in the district plans to communicate Green Schools activities to the superintendent via a student-delivered PowerPoint demonstration, because “if the superintendent sees that the kids are involved in it, it will take off a little better.” Regarding communications to district staff, the district energy manager emphasized the importance of ensuring that the entire school board is included in such communications.

District Energy Policy

According to the team leader of a high-performing high school, the district supports Green Schools, but is unsure of how to implement the program. The contact noted that, “We have to build the Green Schools culture here at the school and also build the Green Schools culture within the district in their management and policies as well.” The contact noted that, since program kick-off, many actions have taken place at the district level that counteract the Green Schools initiative. The contact added that these actions are “not malicious” but have taken place due to a lack of awareness about the program and the absence of a formal policy document.

→ **Implication: Integration and alignment of goals for the program at all levels of school and district administration is an important requirement to avoid staff working at cross-purposes with each other.**

A team leader from a high-performing middle school reports she does not understand the internal processes of district maintenance staff, particularly as they apply to prioritization of work requests. The respondent reports that her team is capable of initiating behavioral changes at her school, but face “bureaucratic” challenges in completing facilities upgrades. According to the respondent, it generally takes several months after requests have been made for work orders to be completed by district maintenance staff and that some of her requests for work were never completed.

Participants would like to see Green Schools’ requests be given higher priority by the district than other facility requests because they will result in saving the district money. Contacts suggest that the Maintenance Department should form teams of designated staff or *tiger teams* to address Green Schools’ facilities upgrades.



One district energy manager plans to create a “policy document” that will include energy savings goals for the district. According to this respondent, the district would involve the Green Teams in creation of the document. Additionally, this contact referenced an existing energy policy document completed for City of San Jose School Districts, which may provide a template for his district’s energy policy document.

➔ **Implication: A district energy policy is desired by participants and would provide critical support to Green Schools. However, the fostering of such a policy is beyond the current Green Schools Program work scope for the implementation contractor, nor does the contractor have the authority or public stature to bring this recommendation to the districts. There is an opportunity for the EARTH Schools manager to increase Green Schools’ clout by working with districts on energy policies. This could be accomplished in partnership with the Edison account representative for the district. The policies might address a single issue or provide an entire roadmap for the district. Edison’s role might be to acquaint districts with Edison’s support for the California Energy Efficiency Strategic Plan,²⁶ offer them examples of energy policies adopted by other districts, and have periodic contact with district leaders to encourage policy development.**

District Share Back of Energy Cost Savings

The Green Schools Program establishes a baseline of energy use and then tracks each school’s energy savings. Program implementation staff encourage districts to return a percentage of their avoided energy costs to participating Green Schools. The “district share back” policy was initially a requirement of the Green School’s program. It is now “strongly encouraged” by program implementation staff, but not required. According to program implementation staff, requiring this policy was found to be impractical within certain districts, because “districts and their budgetary arrangements vary hugely from one to another.” Therefore, staff currently initiate discussions regarding the share-back policy with district staff once the district has agreed to participate in the program. Implementation staff then provide evidence in support of share-back to the district, highlighting the superior program performance of schools in districts that participate in the share-back policy.

Contacts report a severe negative impact to Green Schools programs when districts that initially commit to a share-back policy break this obligation. Program implementation staff note that an approach they have considered and rejected would be to require a contractual agreement for districts who wish to initiate the share-back policy. This option was rejected because “it would scare districts away if we required or enforced such contractual agreements.”

²⁶ California Public Utilities Commission, Rulemaking 06-04-010.



Contacts report that the share-back policy sends a strong signal of support for the program from school districts to principals and school administrators. According to the team leader for a low-performing school, “It would be better if the district returned energy savings, because then the principal would feel a vested interest in getting the students involved. That’s the difference – he’s not that engaged in it. Administration cares more when there is an influx of money.”

Additionally, contacts report that the share-back policy provides a valuable “real life” lesson for students, because, according to one team leader, “that’s what happens at home – if you save money on your electricity bill, you can afford to go out for dinner at the end of the month.”

One team leader disagreed with the district policy that energy costs saved during summer months are not returned to the school. According to this respondent, “This school is used year-round, yet they shut the program down between June and August, which is when we have the greatest potential for savings.”

→ **Implication: The program implementer should explore opportunities for establishing a business case for adopting the share-back feature of the program by documenting the important role it plays in program success in other districts. School districts should be encouraged to continue the share-back feature through summer months.**

One respondent suggested that schools should more frequently report their Greens Schools successes as a strategy to increase participation in the program and to enhance future performance. According to this respondent, receiving recognition for achieving success in the Green Schools Program provides a greater motivation than returned savings. According to this contact, “When schools get awards or recognition for their success in the Green Schools Program, then people start to pay attention. At that point, people start to appreciate the energy savings.”

Program implementation staff report that districts that choose not to participate in the share-back policy can still be successful with the program. According to contacts, in one such district, a team leader recognized the importance of the program and has continued to participate. Contacts report that this school is now part of the Association of Green Schools.

→ **Implication: Edison and the program implementation staff have an opportunity to publicize Green Schools success stories beyond the schools to their district administrators, school boards, and the schools comprising the district, and to the communities served by the schools. Some of these opportunities might also provide a venue to mention a few of Edison’s residential and commercial programs, as appropriate to the target audiences.**

Contacts report that what is done with share-back money has a significant impact on program performance. Contacts report that a high-performing Green School spent more than half of its returned savings on implementing its own energy efficiency recommendations at the school and used the remainder to purchase motivational materials for the team (shirts, backpacks, etc.).



According to participants, these motivational materials “help to recruit younger students (i.e., freshman); then the program perpetuates itself.”

Some participants would like to see program staff communicate to school administrators that share-back dollars are intended to be returned to the Green Team, not to the school general fund. Yet other contacts report that share-back dollars provide a valuable resource to enhance other school initiatives, as well as Green Schools. For instance, the team leader of a high-performing high school reported, “Last year we bought videos on ethnic studies and race, science supplies, and microscopes. We bought all kinds of supplies that we would have never, ever have been able to afford otherwise.”

EDISON SUPPORT

Both the program implementation staff and Edison staff described Edison’s EARTH Schools program manager as constituting a visible presence within Green Schools, attending and speaking at many school events.

The district energy manager that advised new managers to understand facility equipment and operations, as reported above, suggested that new managers attend classes at Edison’s Customer Technology Application Center (CTAC) for demonstrations, training seminars, and special events: “Every time Edison offers a course, I would take it.”²⁷

- ➔ **Implication: Edison’s CTAC is a valued resource. The program implementer should promote Edison’s CTAC to energy managers in participating districts and encourage them to get on CTAC’s distribution list for course announcements.**

According to program implementation staff, each school has an Edison representative to assist with technical questions associated with energy efficiency. Staff report that these representatives work primarily with school districts, not schools. However, according to one district energy manager, “Districts don’t know who their program contact is at Edison.” To address this, the contact suggested that Edison should provide interaction and guidance for each individual district “beyond one meeting per year.” The contact emphasized that this interaction should be “face-to-face, not over the phone.”

- ➔ **Implication: Edison can further promote energy efficiency by providing additional support through its account representatives to districts with Green Schools participants. To do this, the Edison EARTH Schools program manager would need to collaborate with the account representative department, identifying participating**

²⁷ Edison’s Customer Technology Application Center (CTAC), in Irwindale, California, offers free training on energy-efficient technologies. For more information, see <http://www.sce.com/RebatesandSavings/EnergyCenters/CTAC/default.htm?goto=ctac>



districts and suggesting how account representatives can support district efficiency efforts.

LOCAL PROJECT LEADER SUPPORT

Local Project Leaders (LPLs), members of the program implementation team, play a significant role in program implementation, acting as liaisons between Edison, program implementation management staff, and program participants. According to a program implementation contact, “LPLs are critical to the program to help tailor it to the needs of different districts and different schools. They give us the flexibility to have a lot of schools in the program at one time and meet their various needs.” According to an LPL contact, “The LPL position is the most integral part of the program because we work on the front line with teachers, staff, students, and administrators, and we get the first view of what’s happening with schools.” Generally, program participants report a high level of support from LPLs, some going so far as to say, “We couldn’t do it” without the LPLs.

The Green Schools Program currently employs two LPLs to support the participating Green Schools in Edison’s service territory. Each LPL is assigned a maximum of 25 schools. LPLs try to visit each Green School at least every other month – subject to the Green Team leader’s availability. Additionally, they also make a check-up call to the team leader at least once a month.

Program implementation staff report that LPLs assess the needs of participating schools through reviewing workshop evaluations, evaluations from the mid-year meeting, feedback from the end-of-year celebration, and via an end-of-year assessment. Additionally, LPLs assess schools’ needs via informal conversations that take place “anywhere from once a month to on a daily basis.”

Many program participants report that staff turnover within schools and school districts present a challenge to program implementation. LPLs are charged with the responsibility of training replacement staff, but are not always kept informed by schools of such personnel changes.

- ➔ ***Implication:* There is an opportunity to improve program momentum by actively tracking (through phone calls to team leaders) whether Green Team leaders or principals have left the school and, if so, “selling” the program to the new staff member.**
- ➔ ***Implication:* Once a program is fully in place and successfully implemented at a school, program activities need to be codified in order that the school retains some institutional memory and can be self-sustaining once it is no longer supported by the program.**

Program implementation staff report that hiring additional LPLs may present a challenge, because “There is a lot to this program; it cannot all be learned overnight. It would take a couple of years in the making just to bring more LPLs on board.”



Contacts report that prospective LPLs must be self-starters, possess some expertise in the utility business, and also understand the educational system. A program implementation contact reported that prospective LPLs need to “know the educational community, including the public and private school systems, and also have experience working with teachers.” Another program implementation staff cautioned that, as an LPL, “You can’t go with the educational aspect alone; you also have to have some expertise in the utility business.”

➔ **Implication: It is important that the program implementer be prepared to train and mentor new LPLs so that program continuity is not dependent on individual staff members. An LPL handbook might be developed to codify the experience of the existing LPLs and to serve as a training course for any new LPLs.**

TRAINING THE GREEN TEAM

The *Fall Professional Development Workshop* and *Mid-Year Meeting* are the two primary venues for program implementation staff to train Green Teams. The Fall Workshop is an all-day event at which Team members receive Green Schools program information and develop *5-Strand Plans*. By developing plans, teams develop strategies for integrating the program into each school. Each *5-Strand Plan* includes the following components:

1. **Instruction** – how do we use energy to teach our students?
2. **Action** – how will we save energy in our school?
3. **School Involvement** – how will we get our whole school community involved?
4. **Taking It Home** – how do we help students teach their parents and community members?
5. **Facilities Staff** – how will we involve our custodians in our energy-saving efforts?

The members of all Green Teams are invited to attend the Fall Workshop, but attendance is required only for new teams.

At least one representative from each Green Team is required to attend the Mid-Year Meeting. At Mid-Year Meetings: program implementation staff introduce new resources and provide examples of best practices; teams share successes and challenges with one another; and each team evaluates its *5-Strand Plan* and revises it as necessary.

Additionally, the *End-of-Year Celebration*, at which attendance is encouraged but not required, provides “informal training and networking” among Green Schools participants and program implementation staff. The implementer reports trying to schedule this event at a time and location that suits the greatest number of Green Schools participants. Although no single plan will please everyone, interview findings suggest the program implementer would do well to avoid scheduling the event during the weeks students have final exams.



In addition to the subsections that follow, Chapter 4, *Green Schools Resources Assessment*, further discusses Green Teams' training and educational resources.

Fall Professional Development Workshop

Participants report that a great deal of information is covered in the Fall Workshop; however, multiple respondents report confusion regarding how to implement concepts discussed in the training. Several respondents reported that the workshop included too much information and training for one day, and suggested lengthening the training to at least two days.

Program implementation staff report being aware that the Fall Workshop includes a great deal of information and that "it can be quite overwhelming and intense." However, according to staff, "Initially the training was two days long, and as the days progressed, there were fewer and fewer people in attendance. The decision to change the training from two days to one day was based upon recommendations from program participants."

The implementer provides every workshop participant with a printed summary of the workshop information. LPLs are charged with addressing remaining gaps in understanding among workshop attendees through their on-going support activities. According to staff, "Participants may not have captured all the most important parts of the training, so LPLs remind them of what is most important to concentrate on, what is due, and what is optional." Additionally, staff report that teachers and other team members from graduated Green Schools help to provide training and mentorship during the Fall Workshop and throughout the year. Interviewed school respondents who had not attended the workshop reported they did not receive the printed workshop summary.

→ **Implication: The program implementation staff should ensure that Green Team leaders who are unable to attend the Fall Workshop receive all workshop materials.**

Several respondents attending workshops prior to fall 2007 requested that separate "breakout sessions" be offered at the workshop. The program implementer reported that it began instituting breakout sessions with the Fall 2007 Workshop.

→ **Implication: The program implementer appears to be responsive to feedback received from workshop participants.**

Multiple participants requested an increase in the number of presentations from educators and a decrease in presentations delivered by "energy experts." Additionally, several participants suggested that more time be spent conducting "hands-on" activities." According to one such contact, "that's what makes an impact."

Four out of the eight team leaders interviewed suggested that a short description of how to initiate the Green Schools Program within schools should be provided to new team leaders. For instance, one respondent suggested a "starter package" be provided, to explain "how to get going, and how to get buy-in from students." This contact explained, "I read all the lesson plans



about what teachers were doing, but, what little lessons can I do every week to build up to that point? I didn't know how to start." Another respondent suggested a short video on how to begin a Green Schools program.

- ➔ **Implication: A *Getting Started* document, providing an overall guide to Green Schools and common (or "best") school practices/activities, would assist participants in coming up to speed and reduce the dependence on LPLs to build a basic understanding of the program through one-on-one consulting.**

Planning Time

During the Fall Workshop, time is provided for participants to work on their *5-Strand Plans*, which serve as the basis for their implementation plan for the program on their campus. However, multiple participants report that they needed more time outside of the workshop to review and assimilate the materials that are presented in the workshop, to develop their *5-Strand Plans*, and to decide on methods to integrate Green Schools supplemental educational materials into their school curricula. In two instances, first-year Green School respondents reported having not initiated their programs until mid-way through the school year due to difficulty in finding time to engage in the planning process for the program.

- ➔ **Implication: The inability of teachers to set aside time to plan what they perceive as an amorphous undertaking is one barrier to program success. Planning time would be reduced were the Green Schools Program to develop "turnkey" or "off-the-shelf" options for Green Teams.**

Participants report that October is too late in the school year to hold the Fall Workshop and that holding the training earlier would allow them to initiate their programs at the *beginning* of the school year, thus increasing the chance of success. In response to such feedback, program implementation staff plan to begin in the fall of 2008 to hold trainings in September, and now send letters to team leaders at the beginning of summer break providing information on the program and requesting that participants begin considering the methods they will use to integrate Green Schools into their lesson plans.

Instructional Resources Guide and Support Materials

Green Schools Instructional Resources Guides (IRGs) are provided to Green Team members during the Fall Workshop. The IRGs present a series of lesson plans related to energy efficiency that, as of the current edition, are aligned to California educational standards. Implementation staff report that the IRGs are not curricula per se, but are intended to supplement or complement the curricula that teachers currently use in their classrooms.

Three out of eight teams interviewed report having not received updated Instructional Resource Guides. When asked if there is a process to ensure that program participants receive updated IRGs, a program implementation contact responded, "No there probably isn't and there probably



should be.” This contact reported that LPLs become aware of such gaps in program materials on a “catch-as-catch-can basis,” as opposed to a systematic basis, adding “I think that is something we can definitely improve upon.”

- ➔ **Implication: There is an opportunity to systematically track the version of materials distributed to each school, as well as to track turnover of key staff (Green Team leaders and school principals). LPLs could provide current versions (or a website link to the document) to those needing it.²⁸**

Teams report limited use of IRGs. When asked why they have not made use of the Guides, respondents report several obstacles. According to one team leader, “It is difficult enough just to find the time to fit in the California standards.” Another respondent reported that, during the Fall Workshop, staff “just passed out the guide, so I never really looked at it.” A team leader from a middle school reported difficulty integrating the lesson plans into her curriculum because, “California standards do not include an energy component for middle schools.”

- ➔ **Implication: Green Teams appear to make limited use of the IRGs. In addition to the reasons identified by team leaders noted above, possible reasons for the limited use of the IRGs are suggested in Chapter 4, *Green Schools Resources Assessment*.**

SCHOOL AUDITS

Student Energy Audit Training (SEAT)

Program implementation staff offer the Student Energy Audit Training (SEAT) program to provide detailed training on energy efficiency concepts, and to provide the skills and tools necessary to perform energy audits. Keeping with the terms of the implementation contract, SEAT training is provided to three high schools a year. Attendees typically include students, the team leader, and a custodian and/or district energy manager.

The training, initially conducted over two days, now occurs in a single day in response to requests from schools, which are faced with time constraints associated with conforming to what many contacts characterize as the current “standards-driven” educational model. While the implementation staff are able to provide SEAT training at any time throughout the year, typically its spring before schools decide to take the training.

²⁸ The program implementation staff report being limited by budget constraints in the number of Guides they can print and distribute each year. The evaluation team offers two recommendations for this situation. (1) Ensure that new Guides are distributed to second-year schools and active graduated schools whenever a substantial change is made to the IRG. (2) The format and font used in the IRG limits the number of words per page to about one-half to one-third of what could be accommodated with a standard expository format. The current appearance mimics the black-board writing of a primary school teacher. Were a standard font and layout used, the materials would total about 100-150 pages, instead of the current 300 or so pages, and could be printed and distributed more cheaply.



In addition to the one-day training, all team leaders receive a shortened version of the SEAT training during the Fall Workshop so that they too will be able to conduct audits in their schools.

Responses vary regarding the efficacy of the training. Five of the eight schools interviewed received SEAT training. Contacts from two of these five offered positive assessments of the training and contacts from two schools offered negative assessments. Contacts at a fifth school had received two SEAT sessions, each from different trainers. These contacts described one trainer as offering “hands-on” training, which they rated highly; they described the other trainer as providing “conceptual” training, which they rated poorly.

→ **Implication: In common with most training, participants’ assessment of SEAT appears to be strongly correlated with the style of the trainer. The program implementer should systematically obtain feedback from schools on the specific trainer and consider replacing or re-training trainers that do not use a hands-on teaching style.**

Several respondents recommend reducing the conceptual training on energy and efficiency, and also streamlining and clarifying the energy audit training. As one respondent reported, “The instructor talked about energy a lot, but he didn’t talk about the actual goal of the audit.” Another respondent stated, “The training program went into too much detail on calculations of energy usage.” Respondents requested more demonstrations of the audit process in the SEAT sessions. For instance, a high school team leader reported, “It would have been helpful to have an experienced crew from another school come in and show me how to do an audit.”

→ **Implication: Students inclined to take SEAT want to be active. They need hands-on training components and demonstrations, and less reliance on talking as the instructional method.**

A SEAT trainer noted that when students transition from middle school to high school, many Green Schools students cease to participate in the program. In order to retain their participation, this respondent recommended establishing mechanisms to ensure that students understand that the Green Schools Program gets “bigger and better” as students move up through the grades.

A district energy manager recommended hiring a college spokesperson to discuss Energy Efficiency degree programs. According to this manager, if such a contact describes to students the possibility for energy efficiency training at the college level and job opportunities available in the energy efficiency field, “that step takes the program to the beyond.”

→ **Implication: The SEAT program appears to offer opportunities for addressing the workforce education and training strategy objectives delineated in the *California Energy Efficiency Strategic Plan* (see Chapter 1) that will be important to consider for the next program cycle, since this aspect of the program will be emphasized more than it has been in the past.**



Green Schools Toolkit

The program implementer provides a limited number of *Green Schools Toolkits* to circulate among participating schools. The majority of respondents described the kits as useful, but thought several items in the kit are unnecessary for conducting school audits. However, implementation contacts report that the items in kits are not intended solely for audits, but are also intended to be used for instructional purposes. While this may be true, Green Schools newsletters accessed by the evaluation team use the term “energy audit tool kit.”

- ➔ **Implication: LPLs need to ensure that teachers understand that the items in *Green Schools Toolkits* are not intended solely for school audits, but are also intended to be used for instructional purposes. The program implementer might consider referring to the kit an *Energy Education Toolkit*.**

Nearly all of the respondents believed their schools would benefit from being able to retain their kits, rather than borrowing the kits for limited periods, as is the current process. According to one respondent, “One of the things that brought us down to the wire for getting this done was waiting for the kit.” Another respondent emphasized the importance of schools retaining their own kits in order to conduct ongoing monitoring and to train new students.

To reduce the expense associated with each school receiving its own kit, respondents recommend limiting the kit to the two or three essential items and purchasing less expensive versions of each of these items. One respondent recommended reducing stipends to fund the purchase of kits. A district energy manager interviewed recommended that the district, rather than program implementers, pay for the kits.

- ➔ **Implication: Participants believe that energy audits are an important component of the program.**
- ➔ **Implication: The EARTH Schools program manager and the program implementer should collaborate to explore ways to obtain funding to provide to each school throughout the participation period just the items necessary to conduct energy audits (judged by respondents to be the lighting meter, the volt meter, and the temperature gauge). The additional items currently included in kits could either be omitted (to free up funding for schools to retain individual kits) or continue to be “on loan” and circulated among the schools for instructional purposes.**

Audit Process

The audit process involves Green Teams assessing behavior and operations related to energy use at the schools and then making recommendations to save energy. Energy-saving facility upgrades are also considered. Recommendations for behavioral changes and minor facilities upgrades are generated by the teams. Recommendations for major facilities upgrades are typically generated by custodial staff, district energy managers, or team leaders.



According to program implementation staff, it is common for students to present their audit findings to their school boards. Given that schools typically take the SEAT training in the spring, these presentations to school boards may not occur until the summer.

Most respondents report some confusion in conducting school audits, but, through trial and error, report eventual success with this process. Multiple respondents reported that it would be helpful to have a team experienced in the audit process come in to demonstrate the procedure. In response to such feedback from participants, for the 2006-2008 program, the implementer has requested LPLs do simple walk-through audits of each new school. However, interviewed contacts suggest this is not happening at all schools, perhaps due to LPL time constraints.

→ **Implication: Green Teams benefit from hands-on audit training and demonstrations.**

The team leaders from two high schools reported initially feeling overwhelmed by the prospect of auditing their entire schools, due to the school size. According to one respondent, “The training was really motivating, but once we got on campus and realized one room took 45 minutes to audit, we asked ourselves, *how are we going to do this?* When you are faced with a daunting task like that, it’s hard to get motivated.” According to program implementation staff, it is usually not necessary to audit each classroom because “the majority of the classrooms are uniform.” However, one respondent reported, “No two classrooms at this school are the same.”

→ **Implication: The program implementer needs to better understand the challenges in implementing energy audits faced by teams at large schools, and to provide such teams with additional support.**

According to implementation staff, “The Green Schools Program is not an after-school program. It can involve after-school activities, but it is not primarily an after-school program.” Consistent with this view, one respondent felt it is unrealistic to expect kids to come into school after-hours to work on the program.

However, several participants report that there is no time to implement the program during the school day. The team leader of a high school also reported difficulty conducting audits during the school day because “you can’t have kids just wandering the halls with a hall pass.” This respondent therefore conducts audits during after-school hours, which, according to the respondent, presents an additional challenge because “energy waste is happening during class time. A classroom that is saving and wasting energy may look the same after school.”

Program implementation staff report a lack of motivational supplies for SEAT students, noting “It used to be that kids received backpacks and jackets. They wore these and felt that they were part of something great.”

→ **Implication: Student motivation in Green Schools may be enhanced by receiving items that designate them as part of the Green Team.**



Audit Outcomes

Respondents report both successes and challenges regarding the implementation of recommendations from energy audits at their schools. For example, a team leader from a middle school reported that a lack of support for the program among some staff at her school presents a barrier to implementation of behavioral recommendations. The respondent reported communication barriers, a lack of funding, and a lack of understanding regarding district policies associated with facilities upgrades all present challenges to implementing the recommendations. A respondent from a graduated Green School reports success in implementing many of the audit-recommended behavioral modifications and minor facilities upgrades (such as motion sensors), but lacks the funding necessary to implement the more costly facilities upgrades.

Respondents emphasize the importance of school facilities upgrades to make large progress in reducing energy consumption. Regarding Green Schools energy-saving efforts, the principal of a high-performing elementary school stated, “The energy efforts of teachers and students – that’s nothing. The computer upgrades and savings from AC upgrades are much larger.”

According to this respondent, the State of California provides funds to modernize schools approximately once every 20 years. Regarding this upgrade schedule, the respondent stated, “I think those upgrade stages should be shorter. We used not to have schools open in the summer. Now we do. So we need to shorten the length of time when we do these upgrades – that’s why Edison went to the State and suggested that we need to help schools upgrade more often.”

The district energy manager recommended that individual schools look for grants to accelerate the process by which energy-efficient upgrades of equipment take place, but noted, “This is very hard for a single school to do.” Therefore, the district energy manager has worked to enlist the entire district to be on the lookout for opportunities to help fund energy-efficient facilities upgrades. According to this respondent, “If you don’t keep your eyes open for rebates and opportunities to make facilities upgrades with energy-efficient equipment, and instead upgrade with standard equipment, then you have lost that opportunity.”

→ **Implication: The EARTH Schools manager should explore opportunities with Edison’s commercial incentive managers to identify how Edison might leverage the Green Schools Program in general, and its audit component specifically, to facilitate energy-efficient facility upgrades through other program incentives.**

COMMUNITY OUTREACH

One component of the Green Schools Program is to conduct outreach on energy efficiency to the community at large. Respondents report that the *CFL Exchange* provides an effective method to reduce energy use in students’ homes. However, participants report limited success with raising awareness of energy efficiency in the community at large. Two participants reported receiving “good feedback” from students’ families and communities; one of these teachers was very enthusiastic, saying, “I’ve actually had kids’ parents email me and tell me that they’ve gotten



into a new tier [that is, a lower electric rate] by reducing phantom loads, saving \$60-\$70 a month.” However, the remaining six respondents did not report effective community outreach, offering comments such as:

- *“My parents were already doing this stuff.”*
- *“People were somewhat willing to talk.”*
- *“Next year we want to do true community outreach.”*
- *“We need more incentives to move into the community.”*

CFL Exchange

Compact Fluorescent Light (CFL) Exchanges have been conducted by Green Teams as part of school/community activities – like parent nights, science fairs, and PTA events. To record how many bulbs are exchanged, parents are asked to complete a tracking form that lists the number of CFLs they have installed in place of incandescent bulbs in their homes.

According to program implementation staff, “The bulb exchange is a great way for Southern California Edison to promote how easy it can be to be more energy-efficient, and how much not only schools, but also families and the community at large, can benefit from readily-available technologies like CFLs.”

Several respondents reported running out of bulbs. One respondent reported success with the CFL giveaway during the first year of program, but then received no light bulbs the second year, in spite of requesting some. Similarly, a respondent from a graduated Green School reported that the program would have had a larger impact in the community if they had been provided with more CFLs to distribute.

Note that going forward, the Edison Green Schools Program will not involve CFL exchanges.

Ongoing Community Outreach

According to program implementation staff, one of the requirements necessary for graduated Green Schools to receive a stipend from the program is that they must conduct community outreach regarding the program.

One graduated Green School reported having completed a total of seven presentations at other schools and educational conferences during the second semester of the school year. Utility staff and public officials were present at one of these presentations. According to the team leader, “This event was an opportunity for the team to showcase its efforts, but was also an opportunity for the kids to get recognition.” Several newspaper articles were written about the event, providing both team members and their school with a sense of accomplishment, and bolstering support for the program. According to contacts, the event also generated valuable publicity for



the Green Schools Program. Future outreach plans for the team include conducting Green Schools presentations to adult education facilities, colleges, and universities.

Other teams report their future plans for conducting community outreach include conducting audits of city buildings, holding a community exposition of energy-related projects completed by students, and holding a community-wide forum to address issues associated with environmental sustainability.

GREEN SCHOOLS LINKS TO OTHER EDISON PROGRAMS

The Green Schools Program currently has few links to other Edison efficiency and demand response programs. A program implementer staff reported that in prior years they attempted to coordinate Green Schools audit findings with Edison, but this practice was stopped, as it led schools to expect they would be hearing from Edison and “Edison was not set up to respond to such specific requests.” Also in prior years, an Edison Green Schools program manager attempted to establish links with Edison’s Express Efficiency program, yet nothing was established by the time that manager left the position.

If sufficiently educated by Edison representatives, Green Teams would be in a better position to provide the public with information on Edison’s residential programs during their community awareness activities. Going forward, the EARTH Schools manager plans for Green Schools to promote Edison’s Summer Discount and demand-side management programs.

→ ***Implication: The Green Schools Program is loosely linked to other Edison efficiency and demand-response programs. The program can expand its impact beyond students to their families by providing them with information on additional energy conservation and cost-saving opportunities provided by other Edison incentive programs.***

MONITORING, REPORTING, AND CONTINUOUS IMPROVEMENT

Current Monitoring and Reporting

Both Edison and implementation staff describe the current form of the monthly reports the implementation manager provides the EARTH Schools program manager as largely a legacy from decisions made by prior Edison Green Schools managers. (The current EARTH Schools program manager assumed program responsibilities in the first half of 2007; Green Schools had several Edison managers before his tenure.) Both Edison and the implementation staff expressed dissatisfaction with the current reporting format, which is a lengthy narrative document. Shortcomings of the current reporting format include: it is time consuming to prepare; it does not provide program status “in a glance,” such as might be accomplished by tables or charts and other steps to streamline the information; and it does not facilitate a comparison of activities across schools, months, or years.



The monthly reports the LPLs submit to the implementation manager constitute one mechanism by which the program results are documented. The LPL reports form the basis of reports that the implementation manager prepares to Edison as part of its reporting requirements. According to staff, the reports generated by the LPLs include highly detailed summaries of all Green Schools activities, but are written in a “narrative format” and therefore would be “hard to turn into metrics.”

- ➔ **Implication: All parties agree that the monthly reporting processes do not appear to be facilitating program management and need to be improved in order to be more effective.**
- ➔ **Recommendation: The program implementer and the EARTH Schools manager should collaborate to develop a new reporting template that is useful and feasible to adopt. The reporting process should include clearly defined roles and responsibilities for task ownership, due dates, and how the document will be used as a communication tool to facilitate continuous process improvement efforts, including the use of performance metrics.**

According to implementation staff, participants are required to report their program activities in documents, completed at the end of each semester, entitled “first semester or second semester documentation.” At the end of the year, the implementation team edits and compiles the reported activities into the annual year-end *Success Book*, along with the final energy savings results for the schools. Implementation staff report the Success book is a valuable resource to new and continuing schools, which can reference it for ideas, as well to prospective districts and schools to whom the implementer is marketing.

The Utility Manager[®] Software

Up until the forthcoming 2009-2011 program cycle, Green Schools was classified as a resource acquisition program.²⁹ As such, prior evaluations of Green Schools noted the need to develop and implement methods to estimate program energy savings.

In 2006, program implementation staff began providing *The Utility Manager*[®] software to participants during Fall Workshops to enable them to track electricity usage and expenses at their schools. *The Utility Manager*[®] calculates electricity savings against a weather-normalized baseline of electricity use that is adjusted for changes in square footage, retrofits, and other factors that affect energy load at each school.

- ➔ **Implication: The program implementer has been responsive to prior evaluation recommendations for tracking of energy savings.**

²⁹ Going forward, the program is classified as a workforce education and training program.



All participating schools and districts receive the energy data and have online access to it at any time. According to a report the implementation contractor received from the subcontractor that operates *The Utility Manager*[®] for the Green Schools Program, “There have been hundreds of logins [over the previous five months] and Utility Manager reports run by the schools themselves. I remember the first couple of years we launched the online database, almost none of the schools actually used it. It now appears to be popular!”

Interviewed district energy managers reported using the software for their Green Schools. One of the interviewed district staff reported the energy data has helped to increase participation in the program by generating a spirit of competition among the schools regarding energy savings accomplishments. Nonetheless, interviewed teachers offered comments that the software took a long time to learn and was difficult to use.

→ ***Implication: The Utility Manager*[®] software appears to be used and useful, particularly at the district level.**

Continuous Improvement

According to program implementation staff, they have made progress on all of the prior process evaluation recommendations. It was beyond the scope of the current evaluation to verify this claim independently.

The program implementer described four processes in place for continuous program improvement:

1. They seek input from the participants at every event, asking them to evaluate the meeting.
2. At the end-of-year meeting, participants also provide feedback on the program over the past academic year.
3. The implementer provides Edison in its monthly status reports with a summary of all feedback received.
4. They meet regularly with the LPLs to obtain their feedback. They convene meetings twice a year of a California advisory group and they annually convene a meeting of a national advisory group.

According to implementation staff, the California advisory group includes leaders in environmental education and key past participants, including district superintendents and facilities staff, and nonparticipants. They include participants experienced in education and participants experienced in buildings. Each meeting is organized around a different theme, with a set of questions to address, all to the purpose of improving the program and interesting more schools.



According to implementation staff, “The advisory groups led to our current organization of the IRG binders around the 5-Strands. And we added new materials on climate change.” They also are developing best practices in saving energy in schools, which they plan to include in the IRGs.

➔ **Implication:** The program appears to have a continuous improvement process in place. However, it is important that these efforts document lessons learned, action items, and follow-up efforts, and report these to the EARTH Schools program manager on a timely and regular basis, using a reporting format that is effective for all levels of management involved in the implementation and oversight of the program.

FINDINGS FROM IMPACT SURVEY EFFORTS

As discussed in Chapter 2, subsection *Evaluation Objectives and Methodology*, the process evaluation team wrote about a half-dozen questions to include in the impact evaluation surveys being conducted for the program by The Cadmus Group, Inc., working as a subcontractor to KEMA Inc. The impact evaluation team fielded surveys of participating school custodians and teachers for an analysis of impacts.

Six custodians completed the custodian survey, far short of the intended sample of 33 that would have provided 90/10 confidence precision. Twenty-two teachers and non-teacher decision-makers (i.e., principles and district administrators that made the decision to participate in Green Schools) completed the teacher or decision-maker survey, also short of the intended sample of 33.

The responses to the process-related questions included in the impact surveys are summarized here. Note that the sample sizes are too small to be considered statistically representative of the population of participating custodians and teachers. The results are provided here as potentially suggestive of the populations’ responses.

Green Schools Responses to the Impact Survey for Custodians

The six custodians that completed the custodian survey all worked at elementary schools. Only one custodian reported encountering problems incorporating the Green Schools Program at his school and elaborated by stating some teachers were reluctant to unplug some of their equipment. The solution was to speak to those teachers with the aid of another teacher until the situation was resolved.

The program met the expectations of all respondents, and all respondents felt supported by the Green Schools program representative (the LPL) as well (all gave ratings of 9 or 10, using a 0 to 10 scale, where 10 was *maximally favorable*).

When asked if there was anything the program could do to be more successful, one custodian suggested the program could have provided more funding, as well as waiting for the students to



return to school before implementing the program. Another custodian recommended holding an assembly to provide an explanation of the program to the students and staff at the school. Other respondents did not think of anything that could make the program more successful. Final comments were focused on the respondents' desire for the program to continue and be adopted at more schools. Several mentioned they wanted to continue their individual involvement as well.

→ **Implication: Overall, the few surveyed custodians appear satisfied with the program, as evidenced by their desire that the program continue and their plans to continue their involvement.**

Green Schools Responses to the Impact Survey for Teachers

Twenty-two teachers and decision-makers responded to the survey.

Students' enthusiasm for the Green Schools curriculum and information, Green Schools in the community beyond the classroom, and doing the Green Schools activities were rated fairly enthusiastically by most teachers and responding decision-makers (most gave ratings of 7 and above, using a 0 to 10 scale, where 10 was *extremely enthusiastic*). All but a few contacts planned on continuing with the Green Schools activities after the support from the sponsor ended.

Of the teacher respondents, most of the teachers reported only one other teacher from their school was involved in the Green School Program. Only three teachers reported running into problems teaching the Green Schools information. A lack of time and resistance to behavioral changes on the part of other teachers were listed as the issues. These issues were addressed by making time for the program, tying it in to other academic areas, and having patience when dealing with the resistant teachers.

The majority of teacher/decision-maker respondents reported the Green Schools Program had met their expectations (more than half gave ratings of 8 and above, using a 0 to 10 scale, where 10 was *greatly exceeded their expectations*).

When asked if there was anything that the program could have done better, one respondent suggested having more hands-on time with the light bulb power testing meter. Another teacher felt they needed more support from school administration. Other respondents did not think of anything that could make the program more successful. Additional comments focused for the most part on positive feedback about the program and the program staff, saying they were very satisfied with the program and thought the Green Schools staff (the LPLs) did a great job. One respondent suggested making the awards banquet more personal by giving individual recognition to schools to validate and encourage their efforts.

→ **Implication: Overall, the teachers and decision-makers appear satisfied with the program, as evidenced by their plans to continue their involvement.**



→ ***Implication:*** One survey respondent repeated a request made by the interviewed contacts for greater access to the audit kit.



4

GREEN SCHOOLS RESOURCES ASSESSMENT

This section presents the findings from a review of the Green Schools resource materials (Chapter 5, presents an assessment of the program website):

→ Educational Resources

- Learning Objectives
- Elementary and Secondary Instructional Resources Guides (EIRG and SIRG) – also referred to in program documents and the website as the Instructional Resources Binder
- High School and Middle School Student Energy Auditor Training (SEAT) Guides
- Web-based California Lesson Plans
- Toolkit Manual

→ Professional Development Materials

- Professional Development Agendas and Handouts
- School Presentations

→ Implementation Incentives and Processes

- Program Enrollment and Participation Materials
- Reporting and Tracking Forms
- 2008 Monthly Report Narratives (March to July)

→ Technical Support Available to Program Participants

The evaluation team analyzed the Green Schools resources from the following perspectives, elaborated on in Chapter 1:

1. Alignment to California Department of Education requirements;
2. McREL research-based instructional best practices;
3. Best practices in energy efficiency education and training programs; and
4. Ease of implementation and Green Schools sustainability.

The information, analysis, recommendations, and implications that follow are not considered to be a definitive review. Green Schools is a complex program and the evaluation team may have



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missed some key information. However, the evaluation team makes the assumption that, even if information exists, if the team did not find the information in its 40 hours of analysis, then the information is not readily apparent and is likely to be missed by Green Schools participants.

OVERALL ASSESSMENT OF GREEN SCHOOLS RESOURCES

Overall, the evaluators consider the Green Schools Program to have tremendous strengths for school-wide and district engagement in energy conservation and environmental education, as well as substantive opportunities for increasing its overall implementation effectiveness.

DESCRIPTION OF GREEN SCHOOLS RESOURCES

To provide the reader with context for understanding the evaluation team's assessments, this section describes various Green Schools resources.

The evaluation team read a number of supplementary materials to gain a greater understanding of the overall Green Schools Program. The Green Schools website provides a wealth of resources, including a group of lesson plans specifically focused on California standards. Monthly newsletters inform the network of Green Schools about events and accomplishments. The evaluators read the monthly reports from March to July 2008 and the 2003-2006 Success Books *Students Leading the Way*. The professional development and supplementary documents, and PowerPoint presentations provided to the evaluations team, were read and viewed; however, the scope of this process evaluation does not allow for individual review of each document. The overall information, purpose, and organization of these materials was extremely useful to the evaluation team in understanding the complex nature of the Green Schools Program and helped to formulate some aspects of the implications and recommendations. The documents that were reviewed in more depth are described in the following sections.

Program Enrollment and Processes

Program enrollment and process information are provided on a number of separate forms that appear to be given to participants at various times in the school year, prior to the Fall Orientation Workshop. The information includes, but may not be limited to: enrollment forms (e.g., *Statement of Intention*, *Green Schools Application*, and *Third Party Agreement*) and process information (e.g., *Principal and Green Team Member Welcome Letters*, and *Team Member Scope of Work*).

Interactive Professional Development Opportunities

Green Team members are provided with off campus professional development opportunities three times a year during their involvement.



- ➔ **The Green Schools Fall Workshop**, a one day experience, provides participants with the overview of the *Green Schools Visions and Expectations* and the *Green Schools Planning Model* of customized implementation to fit the unique interests and needs at each school. Role-specific training is provided in breakout sessions for teachers, administrators, and classified personnel. Teachers are introduced to the *Elementary and Secondary Instructional Resources Guide* (sometimes referred to as a *Binder*), the *Lesson Plan Template*, *School Energy Audit Toolkit*, the *Utility Management* online energy tracker, the Green Schools website, Green Schools best practices, and the *5-Strand Plan Template*. Administrators and classified personnel are introduced to the Energy Audit procedures, the *Utility Management* online energy tracker, the Green Schools website, and best practices in lighting and network power management. The team learns about the reporting requirements and meets their Local Project Leader, as well as other key contacts and Green Schools support personnel.
- ➔ **The Green Schools Mid-Year Meeting**, a one day experience, is an opportunity for Green Teams to discuss their successes and challenges, and to develop a *5-Strand Plan* for the second semester.
- ➔ **The Green Schools End-of-Year Celebration**, an evening dinner event in May, honors the work of all teams, some of whom share their Green Team activities via student speakers and presentations; stipends are distributed to participants who have fulfilled the requirements and graduating schools receive recognition for their accomplishments.

Educational Resources and Lesson Plans

Statement of Learning Objectives: Empowering Schools through Energy Efficiency

This two-page document describes Green Schools as:

“...a comprehensive program for K-12 schools that uses energy based lessons correlated to state standards to enhance project-based, real world learning encourages energy conserving habits, and saves school districts money on energy costs. Through integrative, hands-on learning activities, the Green Schools teams influence building users, starting with students. The students then become energy educators and efficiency advocates, bringing the energy efficiency and conservation message to their schools, homes, and communities.”

This document also briefly describes the benefits for students, schools, communities, and the environment, and includes features, such as SEAT information, energy tracking, and testimonials.

According to this document, Green Schools is based on the following core principles:

1. A team approach of teachers, students, and facilities staff



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2. The return of savings from the districts to the schools, based on baseline data and tracking savings
3. Stipends based on active participation and submission of reports
4. A “planning model rather than a cookie-cutter model” that lets school teams determine how the program is implemented in each school and district – teachers integrate energy and the environment into the curriculum they already teach; the program provides instructional materials, including professional-quality, hands-on diagnostic tools and training for students in conducting energy audits, and over 200 lessons correlated to learning standards
5. Training for Green Schools teams three times a year – orientation, planning, sharing successes, challenges, and resources
6. Ongoing support from a Local Project Leader in the form of monthly site visits, email, and phone consultation
7. Student leadership

5-Strand (Planning) Template and Sample

This planning document is introduced to teachers at the Fall Workshop and re-visited at the Mid-Year Meeting.

Typically, Green Teams consist of one teacher, an administrator, the custodian, and a few students. Teams are given autonomy to:

“...formulate a plan that fits the unique educational needs and priorities of their school. Implementation of a custom made plan helps energy efficiency become a regular part of the school’s culture and will likely result in greater long-term savings...”

– *Green Schools Program Sample 5-Strand Plan*

Green Teams are required to develop a *5-Strand Plan* for the first and second semesters. The 5-Strands are:

1. **Instruction** – integrating energy into instruction
2. **Action** – saving energy in school
3. **School Involvement** – involving the whole school community in saving energy
4. **Residential and Community Involvement** – taking the energy message home and into the community
5. **School Facilities Staff Involvement** – involving the school facilities staff in saving energy



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The template is laid out in landscape format with one planning strand per row and four months named in the columns, suggesting that actions might occur every month in each of the 5-Strands. The planning template also provides a space to include an *Essential Question*. A sample *5-Strand Plan* is provided.

The *5-Strand Template* used in the 2007-2008 program year and provided by the program implementer to the evaluation team included a sample *5-Strand Plan* that appeared to the evaluators to suggest an unrealistically high bar for Green Team accomplishments. When the evaluation team pursued the issue further, the implementer agreed the sample was not representative of typical Green Team performance. The implementation staff person said they have multiple sample 5-Strand plans they use with Green Teams and provided the evaluator with a more representative example.

→ **Implication: The program implementer should take care to provide realistic examples to Green Teams, to avoid inadvertently demoralizing the teams.**

Green Schools Instructional Resources Guides

The *Elementary and Secondary Instructional Resources Guides* (EIRG and SIRG, respectively), which are currently in the form of spiral-bound documents, in previous years were compiled into a three-ring notebook and are referred to in the sample plan and website as a “binder.” For the purposes of this review, “binder” is considered to be synonymous with EIRG and SIRG. Both the EIRG and SIRG total approximately 300 pages.

Introduction

The EIRG and SIRG begin with a nearly identical five-page introductory section, *Instructions*. According to the instructions:

“The lessons in this book are meant to be used as a support for the project-based learning in which students can engage. As students work on their project, they will develop a need to know the origin of energy, how it is wasted and saved, how buildings work, and what the savings strategies are. These lessons will answer those questions. These materials are not meant to be a curriculum; rather, this collection is a source of ideas for teachers implementing a Green Schools project in their classrooms. You are free to pick and choose which lessons will fill your students’ needs best. The lessons are most useful in the context described below, that is, as part of an academically-based project through which students will both learn across the curriculum and save energy. These instructions are designed to show you how to accomplish these tasks.” (page v)

The section *How to Use These Lessons* (pages v-vii) suggests the following steps, most of which are accompanied by examples, some specific lesson recommendations, or recommended topic areas in which to search for applicable lessons.

1. Introduce the subject of energy to students.
2. Develop an essential question with students.



3. Develop research questions for investigating the answer to the essential question.
4. When students have collected data, talk with them about what the data shows.
5. In the course of analyzing and interpreting the data, students will have questions and ideas about ways to save energy.
6. Extension Lessons provide ways to summarize and extend student learning.

The final topics addressed in the introduction include: a) a brief discussion of energy-saving solutions and strategies (e.g., technical fixes, retrofits, and behavior changes); b) a suggestion to extend students' activities into their home; c) a suggestion to monitor and post results monthly by obtaining and analyzing the school's utility bills, reading the school electric meter, and monitoring classrooms to see if people are keeping their commitments to participate; and, d) a suggestion for assessment (discussed in more detail in the *Assessment* subsection, below).

Organization of the Instructional Resources Guides

Comments offered by the program implementer on the draft version of this report indicate that for the 2008-2009 academic year – subsequent to the 2006-2007 and 2007-2008 periods reviewed for this evaluation – the implementer made a number of changes to the IRG. Seeking to make the IRG “more user friendly,” the guides were reorganized “in accordance with the 5-*Strand Plan* framework the teams are asked to use. In addition, we included a number of updated and new resources.”

- ➔ **Implication: The revisions to the IRG demonstrate the implementer takes steps to continuously improve the Green Schools Program.**
- ➔ **Implication: Unfortunately, the evaluator was unable to review the revised materials under the current evaluation scope and thus was unable to comment on the extent to which the revisions address issues raised in this report. However, the evaluators commend the implementer for its efforts to organize the IRG in accordance with the 5-*Strand Plan* and to update and augment materials.**

Following the Guides' *Introduction*, the lessons are grouped into seven sections for the EIRG, with an eighth section for the SIRG. The lesson groupings are by topic, not by age, as follows:

➔ Action Lessons

- Getting Started
- School Building Surveys
- Topics for Student Research

➔ Background Lessons

- What Energy Does



- Sources of Energy
- Environmental Effects
- Extensions
- Internet Extensions – *in the SIRG only*

Grade Level Designations

Twenty-two lessons appear in both the EIRG and the SIRG. These lessons comprise about half of the 43 EIRG lessons and more than half of the 38 SIRG lessons. Nineteen of the 43 K-5 lessons in the ERIG and 23 of the 38 6-12 lessons in the SIRG are correlated to California standards. Consistent with lessons appearing in both the ERIG and SIRG, within each Instructional Guide, a lesson may be designated as spanning a range of grade levels. The evaluation team noted lessons targeted to K-2, K-5, 1-5, 2-4, 3-5, 3-6, 5-7, 5-8, 6-8, 6-9, 6-10, 6-12, 8-12, and 9-12.

The grade levels targeted by each lesson appear on page 1 of the lesson and on the table that correlates the lesson to the California standards. To locate lessons targeted to a particular grade, a user would need to cross-reference between the EIRG/SIRG and a table that correlates the lessons to the standards, or turn to the first page of each lesson (by referencing the table of contents or by PDF scrolling or hard-copy flipping of the document pages to find the first page of each lesson.

→ **Implication: Were the Table of Contents to list the targeted age next to lesson name, users would be able to easily identify lessons appropriate for their students.**³⁰

Correlation to California Standards

The evaluation team reviewed two *Excel* workbooks that provide the correlation of the *Elementary/ Secondary Instructional Resources Guide* (EIRG and SIRG) lessons to the California K-12 educational standards. The workbooks comprise about 15 worksheets each – one for each set of grade-specific standards in science, mathematics, history/social studies, and English/language arts. The individual standards comprising each grade level/subject area set are listed on separate rows and the Green Schools lessons (lesson name and number) relating to any of the standards on the page appear across the columns, ranging from as few as 3 lessons in kindergarten to as many as 13 lessons in grade 6. The numbers assigned to lessons on the Elementary correlation tables were different from the numbers given to the same lesson in the EIRG (e.g., *The Fable of Max* is lesson #18 on the correlation table and #26 in the EIRG).

³⁰ The implementer commented on the draft version of this report that the 2008-2009 revised IRG includes a restructured Table of Contents that includes this information.



→ **Implication: The correlation tables should be checked against the instructional guides for consistent lesson numbering.**

Any one lesson may be designated as addressing multiple grade level standards. One example is *Reading the Electric Meter* (EIRG pages 128-132). The standards correlation chart identifies this one lesson as addressing all of the following eleven K-5 grade standards:

- **K – Earth Science 3.c:** Students know how to identify resources from the earth that are used for everyday life and understand that many resources can be conserved.
- **K – Math 1.0:** Students collect information about objects and events in their environment.
- **1st Grade – Science Investigation and Experimentation 4.b:** Students record observations and data with pictures, numbers, or written statements.
- **1st Grade – Math Number Sense 3.0:** Make reasonable estimates when comparing larger or smaller numbers.
- **2nd Grade – Physical Sciences 1.b:** Students know an object’s motion can be described by recording the change in position of the object over time.
- **2nd Grade – Investigation and Experimentation 4.g:** Students follow oral instructions for a scientific investigation.
- **2nd Grade – Math Number Sense 1.0:** Understand the relationship between numbers, quantities, and place value in whole numbers up to 1,000.
- **3rd Grade – Physical Science 1.b:** Students know sources of stored energy take many forms, such as food, fuel, and batteries.
- **3rd Grade – Earth Sciences Investigation and Experimentation 5.c:** Students use numerical data in describing and comparing objects, events and measurements. **5.e:** Students collect data in an investigation and analyze those data to develop a logical conclusion.
- **4th Grade – Physical Science 1.g:** Students know electrical energy can be converted to heat, light, and motion.
- **5th Grade – Science Investigation and Experimentation 6.h:** Students record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.

The objective of the lesson, as written, is that students will learn to read electric meters and then apply that knowledge to reading their school’s electric meter. The lesson includes division by a four-digit number (1,000) and multiplying that answer by a two-digit number (10), ending up with a two-place decimal solution that represents cost savings. Four-digit division and place



value multiplication are not introduced until the 4th and 5th grades and are therefore inappropriate for K-3rd grades. The lesson, as written, also does not address the 2nd, 3rd, or 4th grade physical science standards.

- ➔ **Implication: For some lessons, the correlation between lessons and California standards needs to be strengthened.**
- ➔ **Implication: For some lessons, the specified correlation of lessons to California standards assumes student skills beyond those expected for the grade level.**

As another EIRG example, *The Fable of Max* was included in all grades K-4 and it was correlated to the following thirteen standards:

- **K** – Earth Science 3.a
- **1st Grade** – Life Science 2.a and Reading 2.3
- **2nd Grade** – Physical Science 1.c and Reading 2.5
- **3rd Grade** – Physical Science 1.c; Life Science 3.a, 3.b, and 3.c; and Reading 2.2, 2.3, and 2.6
- **4th Grade** – Reading 1.1

- ➔ **Implication: A student may have a single lesson multiple times if multiple teachers select the same lessons, especially if the school participates for more than one year.**³¹

For an SIRG example, *The Not So Gentle Rain* (SIRG pages 224-238) is designated for possible implementation for grades 8th-12th and correlated to 19 standards including:

- ➔ **8th Grade** – Physical Science Reactions 5.a, 5.b, and 5.c; and Investigation and Experimentation 9.a and 9.b
- ➔ **9th-12th Grades** – Chemistry: Acids and Bases 4.a through 4.g; Earth Science: Structure and Composition 8.a and 8.b, California Geology 9.a; and Investigation and Experimentation 1.a, 1.c, 1.d, 1.g, 1.i, 1.j

Lesson Assessments

As mentioned in the subsection *Introduction*, above, the *Instructions* accompanying the EIRG and SIRG (page ix) suggest using *The Great Debate* (pages 250-256) as an overall unit assessment.

³¹ Although none of the eight interviewed Green Teams reported that this occurred, it is the evaluator's opinion, based on its review of program materials and processes, that this is quite possible and, further, that it would be the students – not the teachers – that are aware of this situation.



Six of the 43 EIRG lessons and 5 of the 38 SIRG lessons specifically include assessments. Of these lessons with explicit assessments, two of the six EIRG lessons and four of the five SIRG lessons are correlated to the California Standards.

Consider the assessments for the two EIRG lessons correlated to the California Standards:

- *Save or Waste* (pages 1-2) gives an assessment focused on following directions, communicating effectively, and drawing conclusions – all important skills, but not on assessment of the science standards identified in the correlation chart:
- **1st Grade – Earth Science 3.c:** Students know the sun warms the land, air, and water.
 - **2nd Grade – Earth Science 3.e:** Students know rock, water, plants, and soil provide many resources, including food, fuel and building materials that human use.
 - **4th Grade – Physical Science 1.g:** Students know electrical energy can be converted to heat, light and motion.
- *Two Basic Energy Principles* (pages 167-169) engages students in developing energy maps of common objects like a pencil. The standards identified in the correlation chart were:
- **4th Grade – Life Science 2.a:** Students know plants are the primary source of matter and energy entering most food chains.
 - **5th Grade – Life Science 2.f:** Students know plants use carbon dioxide (CO₂) and energy from sunlight to build molecules of sugar and release oxygen.

For the most part, the lesson as written addresses and assesses understanding of the 4th grade standard (assuming the teacher knows how to make links between the food chain and energy chain); however, it does not address the 5th grade standard.

In addition to these lessons that specifically include assessments, the majority of EIRG and SIRG lessons include some form of student activity sheets that could be used as an assessment, and/or discussion topics that allow for teacher assessments.

The EIRG and SIRG *Instructions* (page ix) suggest making use of *The Great Debate* lesson “as an assessment for a full project,” by which students could write cause and effect paragraphs on various aspects of a project or create a concept map outlining what was learned in each step of the project. However, the evaluation team found no models for how a teacher might apply either of these suggestions and *The Great Debate* lesson itself does not include assessment criteria for either cause-and-effect or concept-map assessment ideas.



Lesson Plan Template

Green Schools teachers are encouraged to personalize the program to fit their existing curriculum and content standards by writing Green Schools lessons. A Lesson Plan template is provided and teachers are invited to submit their lessons for review. The *Green Schools Lesson Plan Template* requires the following sections: *Title of Lesson, Teacher's Name* (optional), *School, District, Overview, Objectives, Subjects, Suggested Grade Level, California Standards Addressed, Time, Materials, Preparation and Background, Procedure, For Discussion, Extensions, and Resources*. Teacher written lessons that the program implementer judges as excellent are then included on the Green Schools website and in some cases added to subsequent editions of the ERIG or SIRG.

Student Energy Auditor Training (SEAT)

The SEAT curriculum and materials are intended to develop conceptual understanding of energy sources, use, and conservation through the analysis of school building energy consumption in lighting and appliance plug load. Students learn to use a light meter, a watt meter, and how to put computers to “sleep.” Participants are guided to develop a school-wide energy awareness and conservation plan.

SEAT was provided to Green Teams at three schools during the 2007-2008 school year.

Organization SEAT Guides

There are separate SEAT *Teacher's Guide for a One-Day Course for Middle School* (207 pages) and *...for High School* (198 pages); the content of the two guides appears to be about 90% identical.

The SEAT one-day guide is divided into *Part 1*, to be covered in the morning and comprising sections on *Energy & Efficiency Concepts, Examining Light and Plug Load, and Getting Ready to Audit*; and *Part 2*, to be covered in the afternoon, comprising *Lighting Audit, Plug Load Audit, and Audit Summary and Follow-Through*. The sections in both Part 1 and Part 2 are further divided into a total of 15 *Mini-Activities*.

The Guides include the following: a *Table of Contents*, the *Purpose*, and an *Activity Planning Guide* with icons indicating when to show slides, do mini-activities, perform audit activities, and add notes to the student Workbook.

The *Activity Planning Guide* lists, in a table, the sections, objectives, number of activities and time, in minutes, required for each activity. A *Master List of Training Materials* details everything needed to both instruct and perform the hands-on audit. Each instructional section includes: *Objectives, Vocabulary, Materials, Procedure, Notes*, and the written contents of related *PowerPoint* slides.



Following the lesson section are two pages of suggestions for extending the learning and engaging the school and community members in energy-saving activities. Finally, the *Appendix* includes the *Glossary*, student handouts and workbook, supplemental materials suggestions and web resources, the pre- and post-test, and a student feedback form.

The High School *PowerPoint* presentation (PP) includes 116 slides and the Middle School PP has 130 slides. It is worth noting that the Middle School version has appropriately reduced the amount of information on some of the PP slides, inserted slides to indicate placement of student activities, simplified the introduction of technical language, and included graphics to alert students to key information that they then record in their Workbooks.

Correlation to California Standards

Allison Oakland of Schatz Energy Research Center at Humboldt State University is acknowledged on page two for correlation of the SEAT Curriculum to California State Content Standards. The correlation documents were not included in the materials received for review.

ASSESSMENT WITH RESPECT TO CALIFORNIA DEPARTMENT OF EDUCATION REQUIREMENTS

The evaluation team assessed the Green Schools *Instructional Resources* and SEAT materials with respect to the California Department of Education requirements, as discussed in Chapter 1.

Science Content / Alignment with Standards (Category 1)

Green Schools *Instructional Resources* and SEAT materials effectively meet most of the California state criteria for alignment with science content standards. Specifically, alignment is good for the following standards:

- **1.1:** Content is scientifically accurate.
- **1.3:** Examples give direct attention to the responsibilities of all people to create and maintain a healthy environment and to use resources wisely.
- **1.4:** Examples include, when appropriate, the historical development of science, its impact on technology and society, and the contributions of minority persons
- **1.5:** When investigations and experiments are included, they are integral to, and supportive of, the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards. The instructional materials include clear procedures and explanations, in the teacher and student materials, of the science content embedded in hands-on activities.
- **1.6:** Explicit instruction in science vocabulary emphasizes the usage and meaning of common words in a scientific context.



- **1.7:** Instructional materials use proper grammar and spelling.

An opportunity for enhancing the Green Schools *Instructional Materials* is in criteria:

- **1.2:** Teaches applicable California Science Content Standards at the intended grade level(s).

The grade level spans and the number of content standards ascribed to the EIRG and SIRG lessons limit the effectiveness of those lessons to ensure student understanding of the concepts addressed in specific grade-level standards.

- ➔ **Implication: Green Schools instructional materials can be enhanced to better attain California Science Content Standards at the intended grade level.**

Lessons appear to have been developed by teachers based on personal reasons (i.e., desire to teach one specific standard, student or local interest, or for implementing a Green Team audit or event). Therefore, important grade level standards that could support student understanding of the energy and environmental issues have not yet been developed into Green Schools lessons. It is understood by the evaluation team that Green Schools does not intend for the EIRG and SIRG to be a comprehensive curriculum, but rather serve as *supplemental* materials.

Nonetheless, the Green Schools documents clearly state an expectation that Green Team leaders will involve the entire school in learning about energy conservation and the environment, and that program materials are correlated to state standards. The first strand of the *5-Strand Plan* is “Instruction: integrating energy into instruction.” This program objective leads to opportunities for strengthening the program materials along the lines suggested in this report.

Finally, the *State of California Science Framework*³² states:

“Professional Development programs should not expect teachers to develop their own curriculum units or use ‘hand-me-down units’ that have been informally produced. Those units may not have been adequately reviewed for accuracy by content experts, or they may inadvertently include activities that are unsafe. Teaching is a challenging job that needs skillful performance by professionals. Similarly, curriculum development requires a special type of expertise. The standards-based accountability system in California is a new experience for many teachers and ensuring that every child receives a standards-based education is a challenge. Teachers need to have outstanding programs developed so that they can be assured that all the content material is covered comprehensively and in appropriate sequence.”

– Chapter 8 Professional Development, page 296 (print copy) & page 300 (PDF version), column 1, pp. 1

- ➔ **Implication: The Instructional Resources Guides might be culled to reduce lessons that lack strong ties to standards or appear to have been developed in response to**

³² State of California Science Framework 2004
<http://www.cde.ca.gov/ci/cr/cf/documents/scienceframework.pdf>.



idiosyncratic circumstances. The culled lessons might be appropriately placed on the website and identified in the IRG as available on the web.

Program Organization (Category 2)

The evaluation team found the Green Schools instructional materials to be somewhat less successful in meeting the California criteria for program organization, which requires that:

“The sequence and organization of the Education and the Environment Initiative (EEI) instructional units provide clear structure regarding what students should learn in relation to each of the identified content standards and a means for teachers to convey science and history–social science content efficiently and effectively while using the environmental principles and concepts as a context for instruction.

The content is organized and presented in a manner that provides:

- **2.1:** A logical and coherent structure that facilitates efficient and effective teaching and learning within a lesson, unit, and year, and works well in conjunction with the State’s adopted instructional materials in science and history–social science.
- **2.2:** Clearly stated student outcomes and goals that are measurable and are based on the Science and History–Social Science Content Standards and the Environmental Principles and Concepts.
- **2.4:** An overview of the content in each lesson or instructional unit that outlines the concepts and skills to be developed.
- **2.5:** Support materials that are an integral part of the instructional program, these may include video and audio materials, software, and student workbooks.

In the view of the evaluation team, the content does not satisfy:

- **2.3:** Explicit statements of the relevant grade-level content standards in the curriculum unit.

Note that while the Green Schools Program is not associated with and pre-dates the EEI, the EEI nonetheless provides the evaluators with an objective framework for assessing opportunities for enhancing the program. (In fact, the EEI does not include energy efficiency education, a condition that speaks to the need for such programs as Green Schools.)

While the Green Schools EIRG and SIRG lessons have a logical and coherent lesson structure (criteria 2.1), the Green Team leader at each school must lead the school’s teachers in figuring out which of the available lessons fit into or could be adapted to work with specific grade levels and existing state-adopted instructional materials. The leaders also have to determine when, throughout the school year, the lessons provide a “logical and coherent” supplement to the curriculum.



Individual Green Schools lessons include stated student outcomes, which for the most part could be measured and thus satisfy the second element (criteria 2.2); however, the student assignments and assessments, where provided by Green Schools, do not necessarily measure the stated outcomes. As noted earlier (see criteria 1.2), the EIRG and SIRG lessons do not include criteria 2.3, and are primarily individual, stand-alone lessons, rather than lessons intentionally designed into units of study.

Green Schools lessons do, for the most part, provide overviews of the content covered, and effective support materials (criteria 2.4 and 2.5).

→ **Implication: The Green Schools Program organization would be well-served by a reorganization of the existing lessons into standards-based, grade-specific, mini-units of study that create a spiraled K-12 continuum, albeit not fully developed curricula.**

Assessment (Category 3)

California criteria for program organization requires that:

EI instructional materials provide: 1) Strategies and tools for continually measuring student achievement including both formative and summative strategies and instruments. 2) Answer keys for all assessment tools.

The majority of reviewed ERIG and SIRG lessons did include some form of student activity sheet and/or discussion topics which could be used as formative assessments by teachers. Roughly, 6 of the 43 ERIG lessons and 5 of the 38 SIRG lessons specifically include assessments. Answer keys were found for most of the activities and assessments except, as would be expected, where open-ended responses were intended.

The Lesson Plan template provided to Green Schools Team leaders does not include the category *Assessments* nor did the evaluation team find documentation of a request for teachers to write lesson assessments. The *Instructions* (page ix) suggest using *The Great Debate* (ERIG pages 250-256 and SIRG pages 215-221) as an overall assessment and SIRG *Lesson 2 Energy Efficient Homes* (pages 3-23) as a project assessment. The evaluation team's review found that some of the assessments, while focused on important skills, do not effectively assess the standards identified in the correlation charts; other assessments do measure student understanding of the identified standards. The suggested *The Great Debate* could serve as a summative assessment of student understanding of energy and environmental issues and use of English/Language Arts communication skills, but might be limited as a summative assessment of content understanding in science or History/Social Studies.

→ **Implication: The Green Schools Program could be strengthened most immediately by adding the category of *Assessments* to the Green Schools Lesson Plan Template.**



- **Implication: A longer term enhancement that has the potential to significantly enhance the Green Schools resources is to review all Green Schools lessons, add assessments where needed, and validate alignment of all assessment to the objectives and standards being taught. This action can be most easily accomplished were it to follow a reorganization of the existing lessons into a spiraled K-12 continuum comprised of grade-targeted mini-units (discussed in a prior implication).**

Such mini-units would require fewer assessments than providing one for each individual lesson. Further, targeted grade level appropriate assessments would be easier to design than ones that span multiple grade levels and standards. Mini-unit assessments, with pre and post options, could be a useful tool for continual program improvement and for enrolling additional districts as participants. It also could provide Edison with data to measure more effectively the impact of the Green Schools Program on content understanding.

Universal Access (Category 4)

The evaluation team is not including findings on universal access for Green Schools, as the team believes the implications of such findings are subordinate to the implications from the assessments of the other California Department of Education requirement categories.

Instructional Planning and Support (Category 5)

This category states:

Instructional materials must contain a clear roadmap for teachers to follow when planning instruction. EEI instructional materials must provide:

- 5.1) A checklist of program lessons in the unit materials, with cross-references to the content standards covered, and details regarding the instructional time necessary for all instruction and hands-on activities
- 5.2) Lesson plans, including suggestions for organizing resources in the classroom and ideas for pacing lessons
- 5.3) Clear, grade-appropriate explanations of scientific concepts and theories; history–social science themes; and environmental principals and concepts; as well as, important events, people, places, and ideas, presented in a form that teachers can easily adapt for classroom use
- 5.4) Lists of necessary equipment and materials for any hands-on activities, guidance on obtaining those materials inexpensively, and explicit instructions for organizing and safely conducting the instruction
- 5.5) If included, homework extends and reinforces classroom instruction and provides additional practice of skills that have been taught

While individual Green Schools lessons incorporate the instructional planning and support criteria (5.1, 5.2, 5.3, 5.4, and 5.5), the Green Schools Instructional Resources Guides as a whole



do not “*demonstrate a clear roadmap for teachers to follow when planning instruction*” – the category’s introductory statement.

➔ **Implication: The Green Schools Program could potentially increase the speed and success of Green Schools implementation by providing a clear roadmap for planning energy audit and environmental instruction K-12. This could increase consistency and measurability across schools without taking away the autonomy of schools in developing their customized 5-Strand Plans.**

In contrast to the *Instructional Resources Guides*, the Student Energy Audit Training is an exemplary model for satisfying Category 5.5 requirements. The evaluation team must note two minor qualifications regarding the SEAT materials. First the evaluators did not have the SEAT correlation to content standards in the documents reviewed. Secondly, the quantity of content and hand-on experiences covered in a one or even three-day experience will likely reduce the quality of the learning experience.

ASSESSMENT WITH RESPECT TO McREL RESEARCH-BASED INSTRUCTIONAL BEST PRACTICES

Educational researchers at Midcontinent Research for Education and Learning (McREL) published *Classroom Instruction that Works*³³ (2001), which documents nine categories of instructional strategies that have strong effects on improving student achievement. Chapter 1 discusses the McREL study and its findings in some detail.

The evaluation team has used the McREL framework to assess the Green Schools educational materials. In doing so, the team does not mean to imply that each of the instructional strategies should appear in every lesson; rather, one would expect a variety of experiences to be provided and strategies used throughout the instructional materials.

Nineteen of the EIRG’s 43 lessons are correlated to the California Standards. The evaluation team briefly reviewed each of these 19 lessons for indications that the lesson employs the nine McREL instructional strategies. The evaluation team similarly reviewed 19 of the 26 SIRG lessons that correlate to California content standards. For the purposes of analyzing the instructional strategies used in SEAT, the evaluation team considered the 15 Mini-Activities as separate lessons and analyzed these.

Conducting a limited exploratory content analysis, the team estimated the nine instructional strategies are incorporated in about two-thirds of the EIRG lessons, over 80% of the SIRG lessons, and three-quarters of the SEAT lessons. On average, each reviewed EIRG lesson

³³ *Classroom Instruction that Works*. Marzano, Robert J., Pickering, Deborah J., & Pollock, Jane E., © 2001 McREL. Publisher: The Association for Supervision & Curriculum Development (ASCD). ISBN 0-87120-504-1 1703 N. Beauregard Street. Alexandria, VA 22311-1714 1800-933-2723 <http://www.ascd.org>.



implemented five of the instructional strategies, each SIRG lesson incorporated six strategies, and each SEAT lesson incorporated seven strategies. Three EIRG lessons, four SIRG lessons, and two SEAT lessons incorporated all nine strategies. One strategy (*Setting Objectives*) is used in all lessons reviewed.

The percentage of EIRG, SIRG, and SEAT lessons incorporating each of the nine strategies is listed in Table 4.1. In practice, the instructional strategies actually employed in the classroom might vary from those indicated in the guide.

Table 4.1: Use of McREL Research-Base Instructional Strategies in EIRG, SIRG and SEAT

STRATEGY NUMBER	RESEARCH BASED INSTRUCTIONAL STRATEGIES	PERCENT OF EIRG LESSONS USING STRATEGY	PERCENT OF SIRG LESSONS USING STRATEGY	PERCENT OF SEAT LESSONS USING STRATEGY
1	Identifying Similarities & Differences	58%	95%	53%
2	Summarizing & Note Taking	53%	89%	86%
3	Reinforcing Effort & Providing Recognition	53%	53%	53%
4	Homework & Practice	63%	84%	60%
5	Nonlinguistic Representations	68%	95%	100%
6	Cooperative Learning	58%	68%	60%
7a	Setting Objectives	100%	100%	100%
7b	Providing Feedback	40%	53%	60%
8	Generating & Testing Hypotheses	58%	74%	80%
9	Cues, Questions, & Advance Organizers	74%	79%	100%

→ **Implication: The Green Schools Program is strong in its use of instructional best practices.**

Green Schools instructional materials consistently incorporate a substantial percentage of research-based instructional strategies in every lesson and the instructional strategies used vary across all of the nine identified categories. Based on our limited review of a subset of lessons, all guides appear typically to use more than half of the nine research-based instructional strategies in each lesson. The SEAT makes the most use of these strategies, followed by the SIRG.

Objectives were provided in 100% of the Green Schools lessons reviewed; however, on average, only 51% of the lessons included any written form of feedback or assessment.

→ **Implication: While Green Schools scores high in setting objectives, this practice is just one part of two-part best practice: setting objectives and providing feedback**



(student assessment). Green Schools makes the least use of feedback of any of the McREL best practices.

Most Green Schools lessons included some form of questioning. However, based on Bloom's Taxonomy,³⁴ a large percentage of the questions elicit answers which require only lower-level, "literal to application" cognitive engagement, while Green Schools program materials state that students engage in "project based student inquiry," which, by definition, requires questioning and cognitive engagement at the "analysis, synthesis, and creation" levels. The SEAT written lessons included a higher percentage of application, analysis, synthesis, and creation questions.

- ➔ **Implication: As additional Green Schools Lessons are written, continue the already strong focus on research-based instructional strategies.**
- ➔ **Implication: There is an opportunity to enhance the Lesson Plan Template by including essential questions focused on higher-level thinking and also adding an assessment section to ensure measurement of and feedback on student achievement.**

ASSESSMENT WITH RESPECT TO BEST PRACTICES IN ENERGY EFFICIENCY EDUCATION AND TRAINING PROGRAMS

Chapter 1 identifies best practices in energy efficiency education and training programs. The evaluation team's assessment of Green Schools suggests it is relatively strong in the following best practices:

1. **Train the trainers (for example, school teachers, project leads) to improve the quality and consistency of trainings.** By improving the skills of trainers and clarifying the expectations of the sponsoring organization, trainers will more effectively and consistently deliver the training content. Regular communication also offers opportunities for continuous improvement and feedback as trainers compare experiences and discuss successful or unsuccessful practices. Curriculum experts and others with knowledge of the learning process should be involved with training new trainers.
2. **Employ curriculum and content experts and have them work together to assure that the information is presented in an effective format for learning.** Sound pedagogical practices must be built into training material to ensure that lessons and information are meaningful and communicated effectively.

The assessment suggests Green Schools needs to improve in the following best practices:

³⁴ Bloom, B.S. (1956). *Taxonomy of Educational Objectives, Handbook I: the Cognitive Domain*. New York: David McKay Co Inc. <http://oregonstate.edu/instruct/coursedev/models/id/taxonomy>.



1. **Defining and targeting desired behavioral outcomes results in more powerful program effects.** Defining the desired behavioral and learning objectives during the curriculum development process helps focus training content on the most important topics. Specificity is important in measuring behavior change.
 2. **Identify the key data required to track and accurately report program activities and success indicators early in the program process** if possible; be prepared to adjust databases as refinements become clear. Carefully document the tracking system.
- **Implication: The assessment of Green Schools relative to Department of Education requirements, McREL best educational practices, and best energy efficiency education practices yield similar recommendations for program enhancement.**

ASSESSMENT WITH RESPECT TO EASE OF IMPLEMENTATION AND GREEN SCHOOLS SUSTAINABILITY

Program Requirements

The Green Team Lead teacher is expected to:

1. Guide a team (students, administrator and custodial representative) and conduct a school-wide energy audit, with or without the benefit of experiencing the SEAT training;
2. Design, support, and implement Green Team school and community events;
3. Communicate regularly with and provide audit and program reports to Local Project Leaders; and
4. Develop coherent links to each grade level or subject so teachers across the school can justify class time away from the state-adopted curriculum to incorporate the Green Schools lessons.

It seems to the evaluation team that Green Team leaders need clear steps for engaging an entire school faculty and student body in this whole-school model. It appears the majority of the Green Schools support is for the team leader, administrator, and custodial representative working with a small team of students to be the agents of change. The next step in evolving the Green Schools Program, especially if it is shifting to a one-year implementation model, requires the development of written support materials for a systematic process to engage all students and teachers in the school. Currently this very time-intensive task falls to the Green Team to invent.

The 2002-2006 Student Success books reviewed seem to indicate a consistent set of 6-12 activities that Green Teams have done across the years. New Green Schools seem essentially to reinvent very similar activities. This reinvention process slows the new Green Team from getting quickly to the project-based problem-solving actions that have the potential for energy savings



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and conservation. Without a comprehensive written program guide, Green Schools' success is primarily dependent on the creativity and leadership of the Green Team leader.

- **Implication:** The evaluation team believes the program would be well-served by the development of a *Green Schools Program Guide*. Green Schools can maintain the *5-Strand Plan* and the project-based planning model of implementation customized to each school, while strengthening the alignment to California State Instructional Materials criteria (specifically in the areas of organization and grade-level-specific content standards, instructional strategies, and assessment) by developing a *Green Schools Program Guide*. A comprehensive, clear, and succinct Green Team guide could be based on simplifying existing documents (i.e., EIRG and SIRG *Instructions*, the Fall Workshop documents, SEAT audit process, and the Green Schools Examples and Best Practices). It could be useful also to include big picture/overview/ process graphics, *Getting Started* checklists, and on-going support contact information. The *Green Schools Program Guide*, if developed, could potentially reduce the amount of time it takes for a Green Schools to see results along all five strands, while increasing whole school engagement and sustainability. The program guide is even more vital if the Green Schools model changes from two years to a one-year model.

Curricula and Lesson Plans

The Instructions included in both the Elementary and Secondary Resource Guides state that the lessons are intended for project-based learning and student inquiry, both of which are regarded as instructional strategies that foster higher-level thinking and problem-solving, as well as student engagement. However, the lessons, for the most-part, are written as teacher directed and conducted lessons, and only one *Instructional Resources Guide* is provided per school. Green Team leaders do not have the time to sort through the current EIRG and SIRG lessons, with the existing assignment of multiple grade bands and standards correlations, to decide which lessons each grade level and subject area can implement that will be aligned with California grade-specific standards. Green Team leaders need small units of study (two to five lessons) at each grade level so all grade levels can effectively engage in the energy efficiency initiative of Green Schools while staying focused on required content.

- **Implication:** The program would be enhanced by the development of a standards-based K-12 sequence of age-appropriate energy and environmental awareness lessons. This continuum of lessons could also include connections to community service and service learning options for students, thereby capitalizing on opportunities to bring Green Schools to an increasing number of districts who



require service learning for graduation³⁵ and may be looking for comprehensive programs.

The IRG documents, due to their roughly 300-page length, are expensive to provide as hardcopy binders to participating schools. Each school receives a single binder. Given their bulk, the binders are unwieldy, which puts an additional barrier to teacher access.

The font used in the IRGs is suggestive of writing on a chalk board; thus, the visual presentation is as if a teacher is communicating with students. The program implementer positions the IRGs as a tool to assist students in their project-based learning. Yet the lesson plans as written are for teachers; only the handouts are targeted to students.

The evaluation team compared the word count of a lesson from the SIRG (page 28-40) with a preceding section in this evaluation report (*Green Schools Instructional Resources Guides*, which includes a number of short lists and special formatting) and determined the IRG uses about 70% more pages to convey the same number of words.

- ➔ **Implication: Every participating school should have many copies of the IRG in order to support the Green Schools goal of whole-school implementation.**
- ➔ **Implication: Changes to the IRGs suggested by this evaluation – specifically reorganizing the lessons into standards-base, age-appropriate mini-units and culling lessons developed in response to idiosyncratic circumstances – will reduce the length of the IRGs and thus increase their affordability.**
- ➔ **Implication: Use of a professional font in the IRG would be consistent with its teacher-focused content and further reduce the number of pages required to present the information, thus increasing its affordability.**

SEAT instructional materials are effectively designed to prepare Green Teams to understand energy concepts, apply them effectively in the energy-audit process, begin problem-solving, and develop a school-wide project. SEAT is currently provided yearly to only three of the Green Schools. The remaining school Green Teams get the information in bits and pieces, and from various sources (i.e., at the Fall Workshop, through the Local Project Leader, and in presentations from Graduated Green Schools Mentors). All of these methods of disseminating the SEAT information are time and personnel intensive, and do not ensure consistent engagement and understanding for the Green Teams. Lack of effective training for the Green Teams and consistent training across the schools is highly likely to account for major differences in the success of Green Schools.

³⁵ CalServe K-12 Service-Learning Initiative and the Corporation for National and Community Service, Learn and Serve America. California Department of Education (<http://www.cde.ca.gov/ci/cr/sl/index.asp>).



→ **Implication: Provide SEAT training to key science teachers (3rd grade – for Energy & Electricity unit; 6th grade – Earth Science; 8th grade – Physical Science; 9th-12th grades – Earth Science, Integrated Coordinated Science, Physics, or Engineering) or a district professional development representative along with the energy manager, who can then provide on-going training for other teachers and students on the content and processes of the energy audits. This training will be more effective if it is accompanied by a commitment from the districts to provide the tools necessary for audits to every school.**

This approach would reduce the LPL time needed to help schools that did not receive the training and LPL time spent loaning out and picking up audit kits. Effectively delivered SEAT sessions, provided over time by district staff or science teachers, could reduce the uneven success in energy savings and conservation among schools with differential access to the training, and make it possible for schools to monitor the year-long effectiveness of energy-reducing initiatives in conjunction with energy-tracking data.

ASSESSMENT WITH RESPECT TO PROJECT-BASED EDUCATION / PROJECT-BASED LEARNING

As stated in the EIRG and SIRG:

“The Green Schools Program uses a project-based approach to saving energy at school and at home. In project-based education, students learn across the curriculum by delving into a project.”

– *GS Instructional Resources Guides (EIRG & SIRG page v)*

The Evaluation Team, after reading all of the materials provided, including the website documents, has a lingering question. Is it the intention that a small team of students supported by the Green Team leader will engage in project-based learning, or is it the intention that all students within a Green School will engage in project-based education?

Project Based Learning (PBL) has evolved over the past few years under the leadership of groups like PBL-Online³⁶ and the Buck Institute for Education (BIE)³⁷ that defines PBL as:

“...a systematic teaching method that engages students in learning essential knowledge and life-enhancing skills through an extended, student-influenced inquiry process structured around complex, authentic questions and carefully designed products and tasks.”

They go on to say:

“Although many teachers ‘do projects,’ not all projects lead to learning. To help teachers use Project Based Learning effectively with their students (rather than simply ‘do projects’), *PBL-Online incorporates the project design methodology developed by the Buck Institute for*

³⁶ PBL- Online <http://pbl-online.org/About/whatisPBL.htm>.

³⁷ Buck Institute for Education http://www.bie.org/index.php/site/PBL/overview_pbl/.



Education. This methodology yields projects that meet today's standards for accountability and teach students the academic content and the 21st century skills they need for life success. The BIE methodology is based on research in constructivist learning, content mastery and critical thinking, and incorporates the project management skills valued by today's global industries. The focus is on helping students move through an inquiry process that stimulates their thinking, engages them in authentic tasks, and demands demonstration of mastery."

The current state of education with mandated curriculum, pacing plans, and high-stakes testing has limited the time that teachers have to engage in PBL. Further, most teachers have not been trained to design and implement PBL. Buck Institute's Professional Development involves a two-day introduction to PBL that focuses on developing the culminating project, two days of assessment development training, and suggests at least a one-day follow-up for teachers after they have implemented their design. As a consequence, many teachers perceive PBL to be at odds with the other demands of their profession.

- ***Implication: The evaluation team suggests that the highly structured and complex planning, assessment, and interdisciplinary expectations associated with the terms Project Based Education and Project Based Learning may not be an advantage to the Green Schools Program. Terms like experiential or hands-on learning may be more representative of the Green Schools Program and less stressful for teachers contemplating implementation.***



5 GREEN SCHOOLS WEBSITE ASSESSMENT

This chapter provides an assessment of the strengths of, and opportunities to improve the Green Schools website. The assessment employs evaluation criteria that were synthesized and simplified from website assessment criteria proposed by the following organizations:

- The American Library Association³⁸
- University of Arizona – AzTEA (Arizona Technology in Education Alliance)³⁹
- National Endowment for the Humanities⁴⁰
- Oracle ThinkQuest Educational Foundation⁴¹

The Green Schools website was created by the Alliance to Save Energy (ASE) and comprises a portion of the organization’s full website (<http://www.ase.org>); Appendix B provides a 21-page descriptive of this website. Many pages are cross-referenced between ASE programs and topical entries on the ASE site, as noted in some of the discussion that follows.

The Green Schools website, intended for multiple audiences, will at times be considered as a whole and, for the most part, will be looked at through the lens of an educator audience and the Green Schools Program. The first two evaluation criteria discussed – for *Organization* and *Presentation* – require that the evaluation team look at the entire website, while the criteria of *Educational Program Information and Content*, and *Curriculum* necessitate a focus specifically on the *Green Schools* and *Educator* pages.

The website assessment is organized into discussions of the following criteria:

→ Organization

³⁸ ALA American Library Association *Great Websites for Kids Selection Criteria*. ALA 50 E. Huron Chicago, IL 60611 Call Us Toll Free 1-800-545-2433
www.ala.org/ala/alsc/greatwebsites/greatwebsitesforkids/greatwebsites.cfm.

³⁹ Dr. Alice Christie’s *AzTEA Arizona Technology in Education Alliance Exemplary Website Awards* evaluation rubric. See <http://www.west.asu.edu/achristie/webaward/rubric1.html> and <http://www.west.asu.edu/achristie/webaward/rubricp.html>.

⁴⁰ National Endowment for the Humanities *About EDSITEMent: Website Selection Criteria*
http://edsitement.neh.gov/about_criteria.asp.

⁴¹ Oracle ThinkQuest 2009 *Website Evaluation Criteria*
<http://www.thinkquest.org/competition/website/evaluation.html>.



- **Presentation**
- **Philosophy and Academic Standards**
- **Audience**
- **Educational Program Information and Content**
- **Curriculum**
- **Technical Aspects**
- **Media Use**
- **Written Language Mechanics**
- **Sensitivity**
- **Originality**

Each discussion begins with a summary of optimal website characteristics relating to the criterion, against which the assessment of the Green Schools website is made. Following this listing of optimal characteristics, the evaluation team provides an assessment of the strengths of the Green Schools website, followed by the opportunities for improvement, based on the optimal characteristics.

SYNOPSIS OF ASSESSMENT

The evaluation team found the information and content provided to be a tremendous resource for the various audiences, and hope that the opportunities indicated below can make this incredibly valuable web resource even more useful to the educational community.

If the website visitor knows specifically what they are looking for or has the interest and time to explore, then the ASE site is a wealth of information. For educators new to the language of energy efficiency and Green Schools, the pathway toward understanding and developing a Green School may be challenging, resulting finally with *Contact Us*. For the novice, the extent of information can seem massive and lacking a clear application at their own school site. Each click takes the educator deeper or more broadly into the content without clear next steps or a systematic plan showing how all of the available information connects to implementing a Green Schools program.

EVALUATION CRITERIA: ORGANIZATION

- The site's design and layout make it easy to use.
- *Home* page provides a site map or logical structure for exploring an area of interest.



- Every page is visually well organized.
- Content organization holds the reader's attention and eases transition between sections.
- Site allows for an active, constructive relationship to the content (e.g., search, blog, forum, wiki).
- Contact information, name of site, and revision date are provided on each page.

Organizational Strengths

- ➔ Two Navigation Bars are available on every page. The left column is organized for specific user groups (i.e., *Consumers, Educators, Policy Makers, Alliance Associates, Media, Energy Professionals, and Contributors*) and the top horizontal bar is organized by content categories (*Home Topics, Programs, Countries, News, Events, About Us, and Contact Us*) and, when rolled over, the contents are revealed for quicker access.
- ➔ Every page has consistent organizational features including ASE logo, photo-header, search, two navigation bars, three column organizational structure, and colors.
- ➔ The horizontal navigation bar has pull-down menus so the user can see the contents of each category. The site provides a logical structure for exploring the site by user and areas of interest.
- ➔ Contact information, name of site, and copyright date appear on every page.

Organizational Opportunities

- ➔ **Include a site map on the home page.**
- ➔ **Add a drop down menu to the left column navigation bar so, as audiences roll over their links, the contents are revealed.** For example, if an educator wants to quickly find other links, they currently either have to look at each of the pages in order, jump around and find a few links on each page, or make a fairly logical guess and go to *Tools and Resources* [*Home>Educators>Tools and Resources*]. Once there, it is another click on *Teacher Links* to find the 28 resources which are listed with annotation. An optional link, *Energy Education Resources*, on the Tools page offers 12 different resource links. The evaluation team did not find one place where all of the possible Energy Education/Green Schools links could be accessed. Making the transitions between sections more transparent would better serve anyone operating within time constraints.
- ➔ **The pathway bar at the top of each page regularly shows a different path than the one actually taken to access the information.** For example, if the reader accesses the *Green Schools* section from the program page [*Home>Programs>Green Schools*] and clicks on *About Green Schools*, the pathway bar shows [*Home>Programs>Green*



Schools>About Green Schools] which is accurate. However, if the reader clicks *Not in a Green Schools District?* while on the *About Green Schools* page, the pathway bar shows [*Home>News>Not in a Green Schools District*], and if the reader attempts to find the *Not in a Green Schools District?* again by going to the *News* page, the article is not accessible. The only way to return to the *Green Schools* page is with the back button.

- ➔ **The number of links, pages, and documents that have similar titles** (noted in the presentation criteria opportunities below) **adds to confusion in transitioning between sections**. The reader wonders if they inadvertently clicked on the same link again or questions how the documents compare to one another.
- ➔ **Broaden the Search feature to include funding opportunities** (such as incentives for retrofits) for Green Schools, **and more related words to bring up information for visitors who do not know the terminology or organizations involved**. For example, the *Energy Efficient School Construction* page [*Home>News>EESC*] links to the *LEED (Leadership in Energy and Environmental Design) Green Building Rating System*. However, if you search for *LEED*, this page does not appear; instead 73 links to articles appear in a reverse chronological order. This requires a tremendous amount of scanning, scrolling, and reading by the audience.
- ➔ **The ASE site may want to consider a Green Schools chat, blog, forum, wiki, podcast, or other interactive features.**
- ➔ **Include revision dates.**

EVALUATION CRITERIA: PRESENTATION

- The website is clearly identified and found easily through a key-word search.
- The overall layout is clear and easy to follow.
- Content and program characteristics are provided in text and visually.
- Backgrounds and text work together and do not interfere with the ability to read content easily.
- Graphical elements are used consistently.
- Colors, fonts, and layout are creative and artistic.

Presentation Strengths

- ➔ ASE Green Schools is generally one of the first five hits in a Google search. Over 14 million results come up when searching for Green Schools, of which approximately the



first 700 do reference Green Schools projects organized by states, school districts, and both for-profit and not-for-profit groups.

- ➔ The graphics, colors, backgrounds, and texts work well together for easy-to-read content, with the exception of the right column on some pages (see below).

Presentation Opportunities

- ➔ **Bring clarity and efficiency to the website by reducing the redundancy in titles and synthesizing information on various similar pages to make a comprehensive presentation.** For example, [*Home>Educators>Save Energy at School*] has 10 links to sites or documents about energy efficiency. The titles are so similar that the reader wonders where to begin. The evaluation team will address three specifically:

1. *Energy Saving Activities for Schools* [*Home>News>ESAS*] is a list of 29 uncategorized suggestions.
2. *Tips for Implementing a School-wide Energy Efficiency Program* [*Home>News>TIPSWEEP*] is an organized presentation of 10 specific steps for implementation.
3. *Energy Saving Tips for Schools* [*Home>News>Saving Tip for Schools*] provides detailed information on energy-saving behaviors and actions regarding lighting, heating and cooling, computers, and appliances, as well as the focus on district and whole school seen in the former two documents.

Each of the three documents has both unique and redundant features. The reader has to open each document separately; seeing the redundancy, one wonders which document to use and how to assess the usefulness of the differing information. *Energy Saving Activities for Schools* suggests establishing a Student Advisory Council or environmental club (SAC) while *Tips for Implementing a School-wide Energy Efficiency Program*, Step Two says “Establish a Green Schools Team.” The reader likely wonders whether these are different terms for the same function or whether the terms describe groups with different roles. All three documents are redundant in “Involving the district and the whole school.” This presentation and organization issue is pervasive.

- ➔ **Reduce the number and redundancy of categories in the right column *Resources* on pages such as [*Home>Educators>Lesson Plans>Elementary Lesson Plans*].** For example, *Lesson Plans* appears as a heading three times in the column. Different lessons appear under each heading, so the reader has to scroll down the page to see all of the lessons. The heading *Article* appears twice under the *Resources* column. The first listing provides a link to a page that redirects the reader to the Ed.gov Education Resources Organizations Directory, which is not an article but rather a search engine. The second listing of the heading *Article* takes the reader to the publication *Students Leading the Way 2007-2008*; however the 2006-2007 publication of *Students Leading the Way* is found



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under the heading *Regional Initiative*. Creating organizational and presentation consistency is recommended, as this same *Resources* listing occurs on the pages for *Middle School Lesson Plans*, *High School Lesson Plans*, *Earth Apple Awards*, and *Green Schools Resources*.

→ Consider options for additional visual elements.

EVALUATION CRITERIA: PHILOSOPHY AND ACADEMIC STANDARDS

- The purpose of the website is stated and evident in the content of website.
- Academic content is linked to state standards.
- Links to sponsoring organizations are provided.
- *Acceptable Use Policy* for the site is clearly stated for all audiences.
- Copyright guidelines, permissions, and public domain notifications are followed.

Philosophy and Academic Standards Strengths

→ This is one of the strongest aspects of the ASE website, which seems to meet the evaluation criteria very effectively.

Philosophy and Academic Standards Opportunities

→ No new opportunities were identified.

EVALUATION CRITERIA: AUDIENCE

- The needs and interests of the communities served are addressed.
- Relevant educational links are provided for the range of communities served.
- Program participants' work is featured.
- Program activities and projects are featured.

Audience Strengths

→ ASE provides information for the following audiences: *Consumers*, *Educators*, *Policy Makers*, *Alliance Associates*, *Media*, *Energy Professionals*, and *Contributors*.

→ Numerous relevant and useful links are provided to the audiences/communities served.



- Green Schools teachers' written lesson plans, using a Green Schools lesson plan template, are reviewed upon submission by teachers, and some are selected for addition to the site. Lesson plans are easily downloaded and not restricted by a password.
- The yearly publication *Students Leading the Way* reports on the original work and successes of Green Schools Teams.

Audience Opportunities

- **Provide an interactive and real-time way for Green Schools participants to share and discuss events and activities, questions, and ideas.** Note: This may be occurring on Intergy's password-protected site for Green Schools, which was not part of this review.
- **Include additional web links.** In searching over 100 other Green School projects, the evaluation team identified additional valuable web links to funding/incentives, energy information, and environmental lesson plans that were not included in the ASE *Educators* or *Green Schools* pages.
- **Make it easier to locate the *Teacher* links.** (This was already addressed, above, in the *Organization* section.)

EVALUATION CRITERIA: EDUCATIONAL PROGRAM INFORMATION AND CONTENT

- All content information relates to the overall educational purpose.
- Program content, processes, and policies are provided.
- Content is expertly presented, as evidenced by depth of information and supporting details.
- Information is accurate, relevant, and valuable to intended audiences.
- A variety of information sources are used, including primary sources (such as interviews, surveys, personal observations, original artwork, and multimedia recordings).
- Sources are credible, credited, and citations are thorough enough to verify contents.
- Information is current (site has been updated within the last two months).

Educational Program Information and Content Strengths

- The ASE website content specific to Educators and the Green Schools Program does seem highly effective in presenting educational content on energy conservation and environmental awareness. It includes accurate, reliable, and expertly presented



information, supporting details using a variety of information sources, and is appropriate to K-12 audiences.

- ➔ Information is updated regularly. (For example, *New Lesson Plans* and the 2007-2008 publication of *Students Leading the Way* have been added recently).
- ➔ Sources of articles, reports, and information are cited, credible, and archived chronologically from newest (2008) to oldest (2001).

Educational Program Information and Content Opportunities

- ➔ **Consider providing a detailed and explicit *Green Schools Program Planning Guide*, as discussed in Chapter 4, *Green Schools Resources Assessment*, and make the guide available to individuals via the website.** Reorganizing and enhancing the presentation of the Green Schools Program content and processes offers one of the greatest opportunities for upgrading the ASE website. Currently, anyone interested in Green Schools is provided a brief descriptor and directed to *Contact Us*. Program policies, requirements, or cost information were not found by the evaluation team during this review. Tips are provided to schools which are not in a Green Schools district, yet the evaluators could not find information for district representatives to determine if the Green Schools Program might be workable for their district, and to learn what exactly the district would be committing to in the way of personnel time and resources. *Contact Us* requires ASE personnel time, while more specifics on the webpage could potentially help district staff make their inquiries more effective.
- ➔ **Clarify the availability of Green Schools resource materials.** The Green Schools Resources page [*Home>Programs>Green Schools>Resources*] provides a description of the *Green Schools Instructional Resources Binder*, the *Green Schools Tool Kit*, the *Green Schools Tool Kit Manual*, and the *Green Schools Technology CD*. In April, 2008, four members of the evaluation team spent significant time searching numerous pages and links before determining that those materials could not be accessed through the website. If these materials, specific to the implementation of Green Schools, are not available to the general public, it would be useful to the reader to have it stated on the web page so that the reader does not waste time searching for materials that are restricted to Green Schools participants.
- ➔ As noted in opportunities relating to the technical aspects criteria, below, **some aspects of the *Educator* and *Green Schools* web pages, which include broken links, have not been updated in the five months that the evaluation team has been accessing this site.**

EVALUATION CRITERIA: CURRICULUM

- Teacher guides, lessons, and resources demonstrate quality instructional design criteria.



- Best practices of technology use in education are demonstrated.
- Full description of content/program curriculum is provided.
- Full description of outreach activities is provided.
- Unique characteristics of the content/program are clearly evident.
- Website intentionally stimulates local, national, and global awareness, presents action steps, and effectively engages others in addressing the issue and making a difference.
- Diverse viewpoints are provided with clear differentiation between opinion and fact.

Curriculum Strengths

- ➔ The *Green Schools Lesson Plans* selected for uploading on the website have a consistent design format and, as detailed in Chapter 4, are standards-based and utilize a variety of research-based best practices in instruction
- ➔ Descriptions are provided with each of the selected Lesson Plans so that the readers can make an informed choice before clicking on the link and downloading a specific lesson plan.
- ➔ The Green Schools Program encourages student leadership in community projects designed to reduce energy use and engage in environmental protection and conservation.
- ➔ Multimedia, video, and *PowerPoint* are all used to some extent.

Curriculum Opportunities

- ➔ **Provide detailed and explicit *Green Schools Instructional Resources Guides*, as discussed in Chapter 4, and make the guide available to individuals via the website.** The access could be password restricted.
- ➔ **Green Schools Lesson Plans are not considered to be a curriculum; however, available lessons could be more effectively categorized by similar content,** rather than as currently listed, apparently in chronological order by the date of creation. Searching down a random organization of lessons can be time-consuming for educators.
- ➔ **Distinguish between SEAT and STEM curriculums.** Are these interchangeable or separate programs? Is SEAT the latest revision of STEM? Both are referred to on different pages, leading to reader confusion.
- ➔ **Consider describing in more detail and featuring more of the outreach activities of the participating and past Green Schools.**



- ➔ **Consider providing more links to local, national, and international issues, and student designed projects to address energy and environmental issues.** For example, provide a link to the *2007 Presidents' Environmental Youth Awards (PEYA)*,⁴² which honors award-winning projects in each of 10 national regions. Green Teams might decide to enter their work to PEYA.
- ➔ The evaluation team, in this limited review, did not see evidence of diverse viewpoints being presented, but would expect to find examples in a comprehensive review of the archived articles.

EVALUATION CRITERIA: TECHNICAL ASPECTS

- Printing or downloading documents is fast and easy.
- Links to related sites are appropriate and informative.
- Links are accessible and work effectively.
- Additional software is accessible as needed.
- Graphics are optimized.
- Multimedia resources work properly.

Technical Aspects Strengths

- ➔ Documents are formatted as uploaded files, PDFs, or links, and all of the ones tested by the evaluation team were fast and easy to download and print.

Technical Aspects Opportunities

- ➔ **As a majority of downloads are in PDF format, providing Adobe Acrobat software for anyone needing it is recommended.**
- ➔ **In a limited spot check by the evaluation team, broken links or missing content were found** on the following pages:
 - [Home>News>Reference Articles] <http://www.ase.org/content/article/detail/3721>
 - [Home>Topics>Saving Energy in Schools] *School Retrofits*
 - [Home>News> School Retrofits] <http://ase.org/content/article/detail/640>

⁴² See <http://www.epa.gov/enviroed/peya/peya2007.html>.



- The link to *Rebuild America Program* is broken.
- [Home>Programs>Green Schools> California Green Schools] <http://ase.org/greenschl/ncapilot>.
 - The third paragraph says *Click on the links to the right to get started!* however there are no links.
 - The next line says *Featured Top Picks* and below is an error message, “My SQL Error:1045: Access denied...”
- [Home>Programs>Green Schools] <http://ase.org/section/greenschl/>
 - Right Column *More for Green Schools*: the link to *Baltimore Sun.com Green Schools.kids 6/12/2006* takes the reader to the *Baltimore Sun* search page, however a search for the title yielded *No Results*.

The Evaluation team did not attempt to determine if these examples are isolated instances or typical of the entire site. However, the evaluation team first viewed and printed these pages in April 2008 and the broken links were still present in September 2008.

➔ **Teacher links could be made more accessible**, as noted in the *Opportunities For Organizational Criteria* above.

EVALUATION CRITERIA: MEDIA USE

- Multimedia (for example images, audio, video, animation, games, interactive features) is used purposefully to enhance the presentation of information, engage the user more deeply, and demonstrate key concepts.
- Media elements (such as movies, photo essays, digital stories) include a concise written synopsis that deepens understanding of the topic.
- All media elements are essential components creating understanding and/or emotional impact.

Media Use Strengths

- ➔ Multimedia is used effectively in the *Energy Hog link*, which incorporates games, home schematics, mazes, and other engaging challenges for students that convey the importance of and actions for energy conservation.
- ➔ Links to the *Phantom Hunter Video* and the *Howard County Film Festival* winners are included with a short description of the contents of each video. These videos were created by students and the actors are students (middle school to college age), which can have the emotional impact of inspiring creativity in the students who view these films.



Media Use Opportunities

- Consider adding links to selected Green Team *PowerPoint* presentations that were used for the End of Year Celebration or for presentations to new Green Schools. These presentations can provide a model for new Green Schools Teams.
- Consider setting up media contests, challenges, or expositions across the Green Schools, which could be photo essays, documentaries, or short videos showing Green Teams in action on different aspects of the Green School audits or school-wide actions.

EVALUATION CRITERIA: WRITTEN LANGUAGE MECHANICS

- Writing is concise and easy to understand.
- Grammar and usage are correct.
- Punctuation and spelling are correct.

Written Language Mechanics Strengths

- The amount of written information is sufficient to introduce the various articles and publications on each page and easy to understand, with the exception of similar titles to various documents, noted above in the *Presentation* criteria.
- Based on the evaluator's limited review, the website grammar, usage, spelling, and punctuation seem to be correct, with a few exceptions noted below.

Written Language Mechanics Opportunities

- A few spelling errors were noted in the Lesson Plans.
 - In descriptive paragraphs for the Middle School Lesson Plan *The Formation of Fossil Fuels*, the word misspelled is *knowledge*.
 - In *Cost Effective Buying*, the word *effectiveness* is misspelled.
 - In the High School Lesson Plan *Generate Your Own Hydropower*, the word *converted* is misspelled.

EVALUATION CRITERIA: SENSITIVITY

- Awareness of and respect for the cultural diversity in the communities served is demonstrated.
- Language needs of the communities served are addressed.



- Sensitivity to the special needs of communities served is apparent.

Sensitivity Strengths

- ➔ Photos of ethnically diverse students and a teacher appear at the top of the *Educator* pages and most other pages have at least one photo showing some diversity.
- ➔ The *Topics* category includes *Recursos en Espanol*, which has a variety of energy resource documents and link to sites in Spanish.

Sensitivity Opportunities

- ➔ **The link to Spanish language resources should appear on the homepage to make it easier for non-English speakers to find it.**
- ➔ **Include photos representing more of the ethnically diverse communities served.**
- ➔ **In California Green Schools over 22 languages are spoken by students' families. Adding energy saving information in additional languages would better serve the California communities.**
- ➔ **In this limited analysis, no specific evidence of sensitivity to the special needs of communities served was identified.** Including information on funding sources/ incentives for school and home retrofitting, and energy-saving resources for high poverty communities, or making it easier to find existing sources for incentives, grants, or initiatives would be useful.

EVALUATION CRITERIA: ORIGINALITY

- Website is creative and original in its approach to presenting the topic.
- Written content, photographs, artwork, and presentations are original work.
- The majority of content is not paraphrased or copied from outside sources.
- Website structure, design, and style are unique and original.
- The site has special features that attract or engage users.

Originality Strengths

- ➔ In a cursory scan of 100 of the approximately 700 websites by various organizations with activities that complement those of Green School, over half of the sites have links to ASE Green Schools or display content, specifically lesson plans, which were created by



teachers in the ASE Green Schools Program. This suggests that the original work of ASE has proven useful to and been borrowed by multiple groups.

- ➔ Selected Teacher Lesson Plans and the yearly publication *Students Leading the Way* are the original work and implementation results of Green Schools Teams.

Originality Opportunities

- ➔ **Include feature articles and descriptions of the school-wide and community outreach activities of the participating and past Green Schools.** Much of this information is already included in the yearly publication *Students Leading the Way*. Select a few schools each year and highlight their work.



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6

GREEN SCHOOLS REPORTING AND PERFORMANCE INDICATORS

Edison is seeking monthly status reporting that will provide indicators of program effectiveness and continuous improvement. Interviews with both Edison and program implementation staff found general dissatisfaction with current reporting, as it is time-consuming to produce and read, and does not readily support tracking program achievements over time or across schools or districts.

This chapter is organized into two main sections:

- **Current Status Reporting**
- **Performance Indicators**

CURRENT STATUS REPORTING

The Green School program implementer provides Edison with a “monthly report narrative.” The evaluation team analyzed three of these reports – those for February, March, and April 2008 – to form an understanding of the monthly narrative report’s typical content.

Status Report Format

The three reports (February, March, and April) are comprised of between 8 and 11 pages each; appended to each were about a dozen attachments providing supporting documentation.

The reports reference 14 “Program Activities.” The evaluation team infers these activities are called out in the Green Schools implementation contract. These 14 activities are itemized here as background to the description of the monthly report structure. The 14 Program Activities are:

1. Sign Contracts with Local Project Leaders
2. Identify School Districts to Participate; Recruit Schools
3. Conduct Professional Development Workshops
4. Reporting of Program Activities
5. School Teams Site Stipend
6. Promoting Energy Efficiency Measures in the Community
7. Convene California Green Schools Advisory Council
8. Student Energy Audit Training (SEAT)



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9. Continuing Support of Graduated Green Schools
10. Energy Baseline Tracking Program
11. Mid-Year Meetings
12. Light Bulb Exchange
13. Teacher Lessons
14. Students Leading the Way, Success Stories Publications

The monthly report narratives are structured as follows:

1. Program Description
 - This section is a paragraph that repeats each month.
2. Administrative Activities
 - The subsections in this section describe the month's activities and thus vary by month.
3. Marketing/ Recruitment
 - The subsections in this section describe the month's activities and thus vary by month.
4. Direct Implementation Activities for the Month
 - This section discusses program activities in each of the 14 Program Activity areas (denoted by section subheadings) in which there was activity for the month.
 - Some Program Activity discussions include subheadings for specific schools or communities.
 - Following the status of each Program Activity area with activity, there is a subheading *Additional Program Accomplishments*, which in turn comprises subheadings for specific schools. This section comprises, for the three months reviewed, between 25% to 43% of the section *Direct Implementation Activities*.
5. Program Performance / Program Status
 - Check box to indicate status; one of three options (program is on target; program is exceeding expectations; program is falling short of expectations).
 - A brief explanation in support of the status box checked
6. Program Achievements for the Month
 - Provides a one-line or several-line states of the 14 Program Activity areas.



- Examples:
 - “This deliverable is completed.”
 - “This deliverable is ongoing and on target.”
- 7. Changes in Program Emphasis, if any
 - Typical statement: “None”
- 8. Discussion of Near-Term Plans for the Program over the Coming Months
 - A few bullet points on upcoming activities
- 9. Changes to Staffing and Staff Responsibilities, if any
 - Typical statement: “None”
- 10. Changes to Contracts, if any
 - Typical statement: “None”
- 11. Changes to Contractors and Contractor Responsibilities, if any
 - Either “None” or a brief statement of implementer response to Edison requests
- 12. Number of Customer Complaints Received
 - Typical statement: “None”
- 13. Revision to Program Theory and Logic Model, if any
 - Typical statement: “None”
- 14. Attachments

One thing to notice from this structure of the Green Schools monthly report concerns the section *Direct Implementation Activities*: between one-quarter and roughly one-half of the reported implementation activities do not fit within the reporting structure of the 14 Program Activities.

➔ ***Implication: The current monthly status report does not provide a framework for assessing program effectiveness and continuous improvement.***

PERFORMANCE INDICATORS

A comprehensive review of program activities, outputs, and outcomes for the 2009 to 2011 program cycle conducted by the evaluation team suggests the following indicators for program activities, outputs, and outcomes for review and consideration by the program management team and program implementation staff.



The following list consists of 55 items grouped into four categories. The evaluation team suggests Edison specify perhaps five or six indicators in each of four categories, for a total of 25 or fewer metrics.

- ➔ ***Implication: Performance metrics drive program activity; therefore, Edison should identify the indicators that are most closely aligned with Edison’s primary program objectives – creating awareness, attitudinal and behavioral changes related to energy conservation, and environmental stewardship.***

Possible Green Schools (Implementer) Output Performance Indicators

Possible Green Schools output performance indicators include, but are not limited to:

- ➔ Instructional resources augmented or refined [per improvement goals established at outset of year; a yes/no indicator of one or more specific improvements or a percentage of planned improvement accomplished]
- ➔ Number of districts recruited
- ➔ Number of schools recruited
- ➔ Number of schools with established Green Teams [per prior agreement on the term *established Green Team* – example: three or more school staff/teachers, recognized by the principal]
- ➔ Number of school-staff professional development meetings
- ➔ Number of school staff attendees at professional development meetings
- ➔ Number of *Instructional Resource Guides* distributed
- ➔ Number of school awards given
- ➔ Number of student professional development meetings
- ➔ Number of student attendees at professional development meetings
- ➔ Number of student awards given
- ➔ Number of SEAT-trained schools
- ➔ Number of SEAT-trained school staff
- ➔ Number of SEAT-trained students
- ➔ Number of schools trained in tool kit
- ➔ Number of school-staff-members trained in tool kit



- ➔ Methodology for supporting schools improved [per improvement goals established at outset of year; a yes/no indicator of one or more specific improvements or a percentage of planned improvement accomplished]
- ➔ Number of schools for which LPLs provided support [per prior agreement on definition of *provided support* – example: thirty or more minutes spent in telephone or in-person contact]
- ➔ Number of districts for which LPLs or Green Schools staff provided support [per prior agreement on definition of *provided support*]
- ➔ Number of media efforts [per prior definition of term; example: press release]
- ➔ Estimated audience reached through media contacts

Possible Green Schools (Implementer) Outcome Performance Indicators

The following identify important performance indicators for consideration as they relate to core program outcomes:

- ➔ Percentages of participating students that demonstrate:
 - An increased understanding of energy, its uses, and the environmental importance of conserving it
 - Knowledge of concrete things they can do to reduce school resource use
 - Knowledge of concrete things they can do to reduce home resource use
- ➔ Percentage of teachers that demonstrate knowledge of concrete things they can do to reduce school resource use
- ➔ Number of classrooms that demonstrate reduced use of lighting and plug loads
- ➔ Number of schools that demonstrate reduction of lighting and plug loads in non-classroom facilities
- ➔ Number of schools that demonstrate reduce need for electro-mechanical heating, cooling, and ventilation

Possible Green Team (Teacher) Output Performance Indicators

The Green Team indicators include a variant not evident in those for Green Schools: the program can reasonably be judged on how many schools do a given thing at all over the course of a year (such as conducting a direct-action, energy-savings activity), as well as how many such things occur in a given month. A participating school could conceivably do one direct action during the year or do direct actions every month. Reasonable performance indicators might capture both the



proportion of schools that have taken any action (cumulative to date, from start of the academic year to the month the status report is issued) and the proportion that took action during the reporting period. Although cumulative-to-date and reporting-period-only variants might be used for every indicator, in the items below, the team has identified only the few indicators for which it thinks the distinction has the greatest implication for assessing program performance. Possible Green Team output performance indicators include, but are not limited to, the following (the items that don't indicate a timeframe are intended to be cumulative-to-date):

- ➔ Number of school-wide awareness events held (example: *Energy Hog*)
- ➔ Estimated number of student contacts from school events
- ➔ Number of teacher/staff awareness events held (example: presentations during staff meetings)
- ➔ Estimated number of teacher contacts from awareness events (both school-wide and staff-only)
- ➔ Number of schools with school awareness activities conducted (example: posters)
- ➔ Number of schools with school awareness activities conducted during status reporting period
- ➔ Number of schools with periodic Green Schools newsletters or Green Schools highlighted in school communications
- ➔ Number of newsletters/mentions issued during the status reporting period
- ➔ Number of Green Teams that worked with individual teachers to use the *Instructional Resources Guides* or develop appropriate classroom lessons
- ➔ Number of schools with SEAT-trained audits conducted
- ➔ Number of districts with SEAT-trained audits conducted for district buildings
- ➔ Number of schools with non-SEAT energy-use surveys conducted
- ➔ Number of schools with direct-action, resource-use reduction efforts
- ➔ Number of direct-action efforts conducted during status reporting period
- ➔ Number of community awareness events held
- ➔ Estimated number of community contacts from community events



Possible Green Team (Teacher) Short-Term Outcome Performance Indicators

- ➔ Number of individual teachers that used an IRG lesson or similar lesson during the status reporting period
- ➔ Number of students taught an IRG or similar lesson during the status reporting period
- ➔ Percentages of participating students that demonstrate:
 - An increased understanding of energy, its uses, and the environmental importance of conserving it
 - Increased knowledge of concrete things they can do to reduce school resource use
 - Increased knowledge of concrete things they can do to reduce home resource use
- ➔ Percentage of teachers that demonstrate increased knowledge of concrete things they can do to reduce school resource use
- ➔ Number of schools for which Green Team informed school administrators of no cost/ low cost actions recommended by Team-conducted audits and surveys
- ➔ Number of schools for which Green Team informed school and district administrators of efficiency upgrades (investments) recommended by Team-conducted audits and surveys
- ➔ Number of classrooms that demonstrate reduced use of lighting and plug loads
- ➔ Number of schools that demonstrate reduction of lighting and plug loads in non-classroom facilities
- ➔ Number of schools that demonstrate reduce need for electro-mechanical heating, cooling, and ventilation

Survey Opportunities to Capture Program Effects

The evaluators want to emphasize that Green Schools program performance is to be assessed across all participating schools and districts, and not for any specific participating school or district. Each school can and does do different things as part of their Green Schools efforts. Yet collectively, the Green Schools Program should be able to demonstrate effectiveness.

The evaluators elaborate here on possible formats for surveys of participating students that demonstrate increased understanding of energy and the importance of conservation, and a gain in knowledge of concrete actions they can take at school and at home. Across a random sample of participants, students as a group should evidence an increase in such understanding and knowledge from the beginning of the year to the end of the year.

The 2000-2001 impact evaluation for the Green Schools Program recommended that a pre- and post-survey be carried out with students “in order to more systematically monitor changes in



attitudes, knowledge, and awareness” as a result of program participation. As part of the impact evaluation conducted in the 2000-2001 school year, a pre- and post-survey was developed and administered to a sample of participants that included the following question categories:

→ **Changes in Behavior**

- Turning off lights when not in use
- Turning off lights when leaving a room
- Reminding other people at school to turn off lights when they are not being used
- Keeping the outside door open no longer than necessary
- Taking a drink as soon as you turn on the fountain without waiting for the water to get cold
- Washing hands quickly without waiting for the water to get cold
- Turning off the computer (screen), TV, radio, or other music when not in use

→ **Changes in Knowledge**

- How to conserve energy at school
- Ways that energy is lost or wasted
- How to conserve energy at home
- What kinds of energy your school uses and what the energy is used for
- How coal, natural gas, and oil are used
- How electricity is made
- Potential and kinetic energy
- Renewable and non-renewable energy sources
- How energy use affects the air and water
- How energy use affects trees
- How recycling saves energy
- How much energy your school uses
- How we use energy
- Insulators and conductors
- Reading and using thermometers
- Reading thermostats or electric meters



At the request of the Edison program manager, the evaluation team explored some options for ways to implement a pre- and post-survey for the Green Schools Program. One of the challenges in developing a pre- and post-survey for a program like Green Schools is that there is a wide variation of curricula chosen by teachers across participating schools, making it difficult to develop a standardized set of survey questions that might accurately gauge the effect of the varied curricula to which students had been exposed. As the team from the 2000-2001 impact evaluation stated, “While there is a core of basic efficiency and conservation principles, teachers can choose to cover a very broad range of energy-related materials, making it difficult, but not impossible, to measure student gains in knowledge.”

A standardized pre- and post-survey developed for a program that does not have a standardized curriculum, like Green Schools, may result in some students showing very large changes, while others show very little. This variation could result from differences in the ways that teachers implement the curriculum. While some teachers may directly address the information on the survey, others likely will not. Therefore, survey results of individual classrooms or schools should not be considered indicative of program impact overall. Small changes in an individual measure might erroneously be interpreted as low program impact, when in fact it might be caused by measurement questions that are not matched to what a given teacher decides to teach for the program.

In order to avoid this shortcoming and yet gain a more accurate sense of program impacts, the survey instruments should be divided into several short sections that represent the range of Green Schools instructional aims. By dividing the survey in this way, students in a school that did not teach any given subject might nonetheless demonstrate a gain in knowledge in another area that received a stronger focus. Across the entire population, some students should register a gain in each of the program’s areas of focus. If the pre- and post-survey identifies any areas in which this does not occur, the program should reevaluate whether those areas are feasible for the program to teach and consider altering the presentation of those concepts or eliminating them as a program focus if they are found not to be feasible. Such survey sections might include:

- ➔ Sources of energy people use (when appropriate for the age group, distinguishing between renewable and nonrenewable sources)
- ➔ Sources of water people use
- ➔ Human uses for energy
- ➔ Environmental implications of energy and other resource use, and the value of resource conservation
- ➔ Concrete actions students can take to reduce natural resource use at school
- ➔ Concrete actions students can take to reduce natural resource use at home



Edison and the program implementer might devise short pre- and post-surveys targeted at specific age groups, such as 3-5, 6-8, and 9-12. In addition, surveys targeted at each age group might allow for variation to increase the complexity of the knowledge required. For example, a child in third grade might be asked to name one energy source, while a fourth grader might be asked to name two sources. Alternately, the youngest grades in an age group might be asked to answer the first two questions in each section, while subsequent grades are asked to answer all of the questions in a section. In this way, a single survey instrument can reasonably span three or four school grades. In addition, although the surveys across age groups would show greater variation, each age group could be asked about similar topics in a manner that requires increasing sophistication.

The set of questions that the evaluation team used to assess the effectiveness of the *Energy Detectives Clubhouse Exhibit* sponsored by WE Energies (formerly Wisconsin Electric) in 1999 can serve as an example of a survey of concrete actions students can take to reduce home resource use. (The full report of the study is available on request from the authors.) The study conducted telephone interviews with parents and their children who had attended an energy exhibit at a children's museum, as well as a random sample of parents and children who did not attend the exhibit. The questions used:

- A. [Asked of the parents in the 1999 study] I am going to read a list of different energy behaviors. Please tell me how often your child does each of the following? Does your child, always, usually, sometimes, rarely, or never (read behavior)
1. Close the refrigerator door after getting food they want
 2. Keep the windows closed in the room when the air conditioner is on
 3. Keep window shades & curtains closed in the summer
 4. Close the door when the air conditioner is on
 5. Put clean clothes away so they get worn before being washed again.
 6. Turn off the computer and/or printer when not in the room
 7. Turn off faucets when not using the water
 8. Turn off lights when not in the room
 9. Turn off the radio or TV/VCR when not in the room
 10. Wear clothes and sweaters indoors in the winter instead of asking for a higher thermostat setting
- B. [Asked of the children in the 1999 study] What would you say are three ways to save energy in your home? (Instructions to surveyor: Do not read list, check as many up to three options. List identical to above, plus "other, specify:_____".)

This survey methodology enabled the evaluators to conclude that students who attended the *Energy Detectives Clubhouse Exhibit* engaged in more energy-saving behaviors than the students that did not attend the exhibit, a finding that was statistically significant.



As another example, the PEAK program, sponsored by Edison, is now using the following pre- and post-test, which was developed to measure changes in participant knowledge and behavior towards energy efficiency:

Let's do a practice question first!

1. What is your favorite subject in school?

Math

English

Art

Science

Lunch

Ok, Ok, now to the real questions!

2. Which statement is TRUE about Compact Fluorescent Light bulbs (CFLs)?

CFLs need to be replaced more often than regular light bulbs.

CFLs use 75% less energy than regular light bulbs.

CFLs turn most of the energy they use into heat.

CFLs use more energy than regular light bulbs.

I don't know, but I can't wait to learn!

3. What happens when you install energy saving appliances in your home?

You help the environment and save money.

You receive higher energy bills.

You waste energy at home.

You increase air pollution.

I don't know, but I can't wait to learn!

4. What is the best time to use appliances in your home?

Between noon and 3 pm

Between 3 pm and 6 pm

Before noon and after 6 pm

All the time

I don't know, but I can't wait to learn!



5. What is a renewable energy source?
- A fossil fuel
 - A source of energy that will not run out soon
 - New energy-efficient appliances
 - Energy from newly discovered parts of the universe
 - I don't know, but I can't wait to learn!
6. Which statement is true about renewable energy sources?
- They will run out soon.
 - They pollute.
 - They come from sources like the sun or wind.
 - They are made from fossils.
 - I don't know, but I'd sure like to learn!
7. Which of the following actions does not save energy?
- Turning off the lights when you leave a room
 - Taking shorter, cooler showers
 - Leaving the air conditioner running when you are not home
 - Putting on a sweater or using a blanket instead of turning up the heater
 - I don't know, but I'd sure like to learn!
8. Which statement is true about CFLs?
- CFLs need to be replaced more often than regular light bulbs.
 - CFLs use 75% less energy than regular light bulbs.
 - CFLs turn most of the energy they use into heat.
 - CFLs use more energy than regular light bulbs.
 - I don't know, but I'd sure like to learn!
9. What could happen if people did not shift energy use off peak demand time?
- There could be a forest fire.
 - There could be a blackout.
 - Cars will not start.
 - Our lights will be brighter.
 - I don't know, but I'd sure like to learn!



10. When our needs for energy become too great, what do our power plants have to do?

Take their lunch break.

Turn on older power units, which pollute the air more.

Call the gas company to complain.

Turn off their own lights.

I don't know, but I'd sure like to learn!

11. What does the label say on energy saving appliances?

Energy Sucker

PEAK

ENERGY STAR®

Blubman

I don't know, but I'd sure like to learn!

12. How do you and your family save energy at home (open ended)?

13. Do you talk to your friends and family about the environment? What do you tell them (open ended)?

If Edison and the implementation contractor accept the recommendations from this process evaluation (particularly the recommendation made in Chapter 4 to reorganize the existing lessons into standards-based, grade-specific, mini-units of study), a pre- and post-survey can be drafted for each age group that would be matched to the curriculum to facilitate assessment of the effectiveness of the Green Schools Program in increasing student knowledge and energy efficiency behaviors.

Another option would be to standardize a core portion of the program that all teachers would be required to teach and then develop a pre- and post-survey that covers this core curriculum. This would allow for the development of a standardized pre- and post-survey covering basic knowledge that all students would be exposed to gain, while still giving teachers the flexibility to vary what they teach beyond the core requirements.





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GREEN SCHOOLS CONCLUSIONS AND RECOMMENDATIONS

The assessment of the Green Schools Program addresses the following evaluation objectives:

1. Assess the Green Schools curriculum.
 - a. Assess alignment of current Green Schools educational resources with California state educational standards.
 - b. Are teachers' needs for quality lesson plans met by the program resources?
 - c. How might program educational effectiveness be assessed? (relates to objective 2)
2. What can be learned from currently high-performing and low-performing schools about success factors and barriers to achievement?
3. Are there opportunities to increase the effectiveness of the Local Project Leaders?

In this concluding chapter to the Green Schools assessment, the evaluation team summarizes the findings and draws conclusions relating to each objective, starting with findings relating to the program as a whole. The team's recommendations often address conclusions relating to multiple objectives and so they are grouped together in the last section of this chapter.

In addition to the recommendations in this chapter, the prior chapters explicitly note opportunities to enhance the program and its administration.

OVERALL ASSESSMENT OF GREEN SCHOOLS PROGRAM

Summary of Findings

The Green Schools Program has many ardent supporters among participating schools and districts. Many of the interviewed participants are passionate about environmental education and action; they are grateful the Green Schools Program offers them a forum and tools for teaching students, and for directly influencing the use of natural resources in school and district facilities, and in the homes of students and staff. Participants also appreciated the professional consulting and support they received from the Local Project Leaders.

Green Schools professional development, SEAT training and audit tools, planning and reporting documents, online utility manager, instructional resources, newsletters, and monthly reports support a complex and comprehensive district-focused, K-12 whole-school program. Green Schools encourages the custom design of implementation plans by each school's Green Team,



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with a focus on student-centered inquiry and student empowerment to design events, make presentations, and develop leadership.

The SEAT Training and audit tools provide hands-on use of technology to understand environmental issues and propose solutions to school building energy conservation. Networking and developing a community of learners is fostered by three yearly professional development events, newsletters, Local Project Leaders, and graduated Green Schools mentors.

The evaluation team reviewed a large volume of aids to teaching and direct action that Green Schools provides its participants and judged many of these to be of high quality.

The evaluation team also identified gaps in the Green Schools Program and implementation with Edison schools, which are detailed in the remainder of this chapter.

The evaluation team found little evidence that Edison cross-markets its audit, incentive, and technical assistance programs for households and institutions to the participating Green Schools students, schools, or districts.

Conclusions

The Green Schools Program provides a comprehensive approach to school energy use, addressing at the school and district levels individual knowledge and behaviors, facility operations, and facility investments. The program appears to be quite successful in some schools and districts, and less successful in others.

Opportunities exist to improve the effectiveness of the Green Schools Program, most of which fall into two broad categories:

- ➔ Opportunities for the program implementer to make it easier for Green Teams to get up to speed faster than the current norm, to potentially attain higher performance, and to do so with less LPL support than currently provided.
- ➔ Opportunities for Edison to leverage the Green Schools Program by taking a strategic, comprehensive approach with participating districts that includes the provision of comprehensive energy efficiency services.

ALIGNMENT OF GREEN SCHOOLS RESOURCES WITH CALIFORNIA EDUCATIONAL STANDARDS

Summary of Findings

The Green Schools educational resources are voluminous and include direct teacher professional development through workshops, Instructional Resource Guides (IRGs), Student Energy Auditor Training (SEAT), website resources, tools and planning aids, and other supplemental materials.



The evaluation team assesses the science content of the IRG and SEAT materials as effectively meeting most of the California state criteria for alignment with science content standards.

The educational materials fall short with respect to teaching applicable California Science Content Standards at the intended grade level. Important grade level standards that could support student understanding of the energy and environmental issues have not yet been developed into Green Schools lessons. And for some lessons, the identified correlation between the lessons and California standards is weak; for other lessons, the identified correlation assumes student skills beyond those expected for the grade level.

The IRGs meet five sub-criteria comprising California's standards for instructional planning and support. Yet they do not satisfy the overarching criterion that instructional materials contain a clear roadmap for teachers to follow when planning instruction.

A large majority of lessons in the IRGs lack assessments, yet the California educational standards require measurement of student achievement.

The evaluation team assesses Green Schools as strong in its use of most of the instructional best practices identified by the influential McREL (2001) study. With respect to best practices for energy efficiency education and training programs, program strengths include its training of the trainers, and use of curriculum and content experts in developing the educational content.

With respect to the McREL educational best practices, Green Schools is weakest in its provision of feedback to students. With respect to energy efficiency education program best practices, a program weakness is a lack of clearly articulated learning objectives, expected measurable outcomes, and program success indicators.

The Green Schools materials claim to offer a project-based program, yet a fundamental element of project-based learning is the formulation of essential questions focused on higher-level thinking that guide the learning process. The *Green Schools Lesson Plan Template* does not ask teachers to articulate essential questions.

The SEAT training includes a higher percentage than the Elementary and Secondary IRGs of lessons with application, analysis, synthesis, and creation questions. SEAT training is currently provided to only three Green Schools each year. The remaining Green Teams get audit information to varying degrees, from various sources.

Conclusions

The Green Schools education materials evidence many strengths, including effectively meeting most of the California criteria for science content, satisfying most criteria for instructional planning and support, and making use of a variety of educational strategies research has shown to be most related to positive student outcomes.



The assessments of Green Schools in comparison with California standards, the McREL educational best practices, and energy efficiency education program best practices yield complementary findings with regard to some program weaknesses: a lack of a clear roadmap for student learning and program performance expectations, and a lack of measurement of these outcomes. Further, the Green Schools educational materials do not satisfactorily teach applicable California Science Content Standards at the intended grade level.

The evaluation team understands the program implementer does not intend for Green Schools to be a complete curriculum, nor does it intend that every participating school do the same lessons and activities – or any given lesson or activity. Nonetheless, the Green Schools Program aims to be an educational resource for schools and is designed to serve teachers that are held to instructional standards; thus, it is reasonable to expect the program to conform to educational best practices as reflected in the California educational standards, the McREL study, and energy efficiency educational best practices.

The evaluation team judges the SEAT instructional materials to be well designed to prepare Green Teams to understand energy concepts, apply them effectively in the energy audit process, begin problem solving, and develop a school-wide project. Lack of SEAT for all Green Teams appears to the evaluation team to likely to account for major differences in the success of different participating schools. All of the methods of disseminating audit information are time- and personnel-intensive and do not ensure consistent engagement and understanding for the Green Teams.

The evaluation team offers recommendations below that have the potential to enhance program effectiveness while maintaining the flexibility that enables Green Schools to meet the diverse needs of elementary, middle, and senior high schools that serve diverse populations of students.

ARE TEACHERS' NEEDS FOR QUALITY LESSON PLANS MET?

Summary of Findings

The preceding discussion on alignment with California education standards suggests that Green Schools provides teachers with quality lesson plans – plans that meet most California standards and McREL-identified best teaching practices.

The interviews with the eight Green Teams suggest that teachers are not accessing these lesson plans for a number of reasons. Teachers reported difficulty finding the time to incorporate Green Schools lessons into their curriculum planning. Some reported being overwhelmed by the information presented during the fall professional development workshop and never subsequently looking at the IRG. Some teachers reported that the Fall Workshop information was dominated by information about the Green Schools Program overall and presentations from “energy experts,” with less time devoted to presentations by educators and information about what attendees might specifically do.



A single IRG binder is given to each Green Team, limiting its accessibility to the many teachers in each school. Green Team leaders do not have the time to sort through the current IRG lessons, with the existing assignment of multiple grade bands and standards correlations, to decide which lessons each grade level and subject area can implement that will be aligned with California grade-specific standards. Some second- and third-year Teams had not received updated IRGs that provide the correlation between the lessons and California standards.

The program website provides additional resources potentially able to meet teachers' needs for quality lesson plans or lesson components. The evaluation team assessed the website with respect to 11 criteria. The team assessed the website as strongest with respect to the criterion "philosophy and academic standards."

While the IRG and website lessons have many strengths (as described in Chapters 4 and 5), the team believes that, overall, the ability of these tools to meet teachers' needs is limited by the effort required to navigate the information, and by the information's lack of clarity, cohesion, and conciseness.

Conclusions

While the Green Schools lesson plans clearly have the potential to meet teachers' needs, feedback received from teachers by the evaluation team suggests most teachers are not accessing and benefiting from the lesson plans. Green Team leaders need small units of study (two to five lessons) at each grade level so all grade levels can effectively engage in the energy efficiency initiative of Green Schools while staying focused on required content.

The evaluation team further concludes that changes to the IRGs and website that improve their navigability would greatly enhance their usefulness to teachers. Detailed opportunities for IRG and website improvement are noted in Chapters 4 and 5; below, the team recommends the most significant opportunities for improvement.

ASSESSING PROGRAM EDUCATIONAL EFFECTIVENESS

Summary of Findings

To date, Green Schools has not been assessed on its educational effectiveness. There are two primary difficulties in such an assessment. One, the Green Schools Program does not have a set curriculum; it does not comprise a set of lessons that every school uses; and it does not require specific activities by participating schools. Two, assessing educational effectiveness is difficult, as evidenced by the fact that there is an entire profession dedicated to this topic and that assessment is a topic of national debate relating to the determination of appropriate school policy at the national level.



Conclusions

It is reasonable for Edison to undertake steps to assess the effectiveness of Green Schools and every other educational program it offers. The purpose of such an assessment would be to ascertain whether the student participants *overall* demonstrate an increase in knowledge in key areas, in attitudes favoring resource conservation, and in resource conserving behaviors. The Green Schools Program would be judged as effective if statistically significant positive changes are identified (comparing the answers from students at two points in time – early in the year and late in the year), on average – not for every student or even for every participating school.

It is beyond the scope of the current evaluation to specify the content of pre- and post-tests, as the content will depend on the age group and the elements the program implementer judges to be the main “take away” points for Green Schools. Furthermore, were the program implementer to adopt the recommendation offered in Chapter 4 and repeated below – to reorganize the lessons into standards-based, grade-specific mini-units of study – the assessment instruments should be tied to the main themes from such mini-units.

So while the current evaluation does not specify specific assessment questions, the recommendations below provide Edison with guidance on working with the program implementer to craft educational effectiveness assessment questions.

SUCCESS FACTORS AND BARRIERS TO ACHIEVEMENT

Summary of Findings

The Green Team interviews suggest that the following factors each make an important contribution to Green Schools’ success at any given school:

- ➔ Characteristics of the Green Team leader (enthusiasm, creativity, dedication to energy and environmental education and action);
- ➔ Support of the principal;
- ➔ District sharing of energy cost savings with schools; and
- ➔ Other district support (supportive facilities director or energy manager, supportive superintendent and school board).

These findings are further supported by the evaluation team’s assessment of Green Schools materials (see Chapters 4 and 5). These materials provide a wealth of information, yet lack structure and coherence, and no users’ guide, roadmap, or quick reference is provided.

Thus, the success of Green Schools at any given school rests largely on idiosyncratic factors – the personalities of key participants for each school, as well as on district policies and, finally, the number of years the school has participated in the program. Most Green Teams reported doing very little during the first half-year of their participation.



Program success is time-intensive on the part of the key participants and the Local Project Leaders (see next section for further discussion of LPL effectiveness), and is subject to setbacks when key participants leave their jobs and are replaced by people that lack commitment to the program and creativity with respect to its implementation.

Barriers to Green Schools' achievement are the converse of the success factors: lack of time on the part of participants, lack of willingness or ability to go "above and beyond" for environmental education, lack of succinct supporting materials, and lack of district support.

The research methodology that generated these findings looked at small samples of high- and low-performing Green Schools that also varied in non-program related factors: grade levels (elementary, middle, high), size, proportion of low-income students (as measured by the percentage eligible for the federal free-and-reduced-lunch program), test scores, percentage of English-language-learners, district, length of time in the program, and Local Project Leader. Of these factors, the only clear differences the evaluation team observed to be correlated with program performance are district support and length of time in the program.

Conclusions

District support is cultivated by Green Schools activities over time – activities of the program implementer and the Green Teams – and, as true for school-based participants, is not something that is ever attained in a static sense, but needs to be maintained as the non-program demands of participants' jobs change over time and as participants change jobs.

Within the school, performance increases over time as the Green Teams learn what they might do, take actions, and learn from their actions. Principal support may be present at the outset and, if so, greatly contributes to the Green Team's activity level; yet principal support may also develop over time as the Green Team takes successful actions and publicizes their actions and outcomes within the school community, and as districts communicate their support to the principal by providing the school with energy cost savings, district staff support, or both.

INCREASING THE EFFECTIVENESS OF LOCAL PROJECT LEADERS

Summary of Findings

LPLs play a crucial role in the Green Schools Program as it is currently implemented. The current implementation approach provides schools with a planning tool and a large variety of resources Green Teams might access. The LPLs assist schools in using these tools and resources.

School and district contacts report a high level of support from LPLs. One of the many LPL functions is to assist Green Teams, especially in schools that did not receive SEAT training, to conduct audits and prepare audit findings for administrators. LPLs also are responsible for mundane tasks, such as transporting the audit kits between schools.



The Green Schools Local Project Leaders serving Edison’s school participants appear to bring an appropriate skill set to their jobs. All indications from the current study suggest the LPLs are serving the program well. Many participants commented the LPLs were very responsive and that they “couldn’t do it” without the LPLs.

With respect to ease of implementation and Green Schools sustainability, the evaluation team found that the Green Schools Program expects a lot from Green Team leaders without providing them succinct suggestions for how to hit the ground running. While the program implementer intends for Green Schools to be flexible and to, in essence, grow organically at each school to fit the school’s needs and culture, programmatically this approach requires the team leader to create a Green Schools program at his or her school “from scratch,” using any of the many ingredients Greens Schools provides. In turn, this design requires significant LPL support to team leaders, especially to team leaders that are slow in implementing Green Schools.

The 2002-2006 Student Success books, as well as program status reports, suggest a consistent set of 6 to 12 activities most commonly done by Green Teams across the years. New Green Schools do similar activities as prior Green Schools. Yet nowhere does Green Schools provide a succinct statement of the most commonly undertaken activities, with encouragement to consider launching the program at schools with one or more of these common activities.

Instead, Green Teams have had to create their activities “from scratch” using Green Schools inputs and LPL support. This re-invention process slows the new Green Team from getting quickly to the project-based, problem-solving actions that have the potential for energy savings and conservation. The process also generates significant demands on the LPLs’ time, which then becomes a constraining factor, limiting program success.

Conclusions

There is not enough LPL time available to move schools rapidly up the learning curve. Nor would a program likely be cost-effective were sufficient LPL time employed.

LPL skills are sufficient to the program; their activities in support of schools appear reasonable (although the evaluation team believes LPL responsibility for mundane activities, such as transporting audit kits between schools, is a poor use of the LPL resource).

The LPL resource likely would be sufficient to the Green Schools Program if the Green Schools educational resources and tools changed according to the recommendations made in this study. The development of targeted, concise Green Schools support materials would reduce the one-on-one professional consulting required for effective program delivery.

Programmatic changes that reduce the time and LPL resources required for Green Teams to get up to speed will increase the program’s effectiveness.



A *Green Schools Program Guide*, if developed, could potentially reduce the amount of time it takes for a Green School to establish realistic *5-Strand Plans* and see results along all five strands, while increasing whole-school engagement and sustainability.

A Program Guide need not restrict school creativity or impose a one-size-fits-all approach, either of which would work against program success. Instead, a well designed Program Guide has the potential to aid schools in developing *5-Strand Plans* and project-based implementation customized to each school, while strengthening the alignment to California State Instructional Materials criteria (specifically in the areas of organization and grade-level-specific content standards, instructional strategies, and assessment) and facilitating the program performance measurement Edison needs as part of its fiduciary responsibilities.

The Program Guide should include options approaching “turnkey” implementation to assist Green Teams that find themselves hampered at the outset of their involvement by lack of time to tackle planning for what they perceive to be an amorphous undertaking. Including some turnkey approaches would likely further reduce the amount of LPL time required to motivate and work with lagging schools.

RECOMMENDATIONS

Improving Green Schools Educational Resources

Green Schools educational resources would be improved were the program implementer to address the following recommendations. The items are ordered roughly by increasing level of effort, with the latter elements requiring considerable investment of time and money.

As an overarching recommendation, the evaluation team suggests to the program implementer that it develop a strategic plan for enhancing its education resources and seek funding to accomplish the plan. Funding might come from grant-issuing non-profit foundations, from program sponsors, and from governmental entities (such as the State of California and the U.S. Department of Energy) that are prioritizing the need to prepare the students for careers in energy efficiency, renewable energy, and other professions related to the environment and natural resource use.

Recommendations for the program resources other than the website include:

- ➔ **Ensure all teachers in each Green School have ready-access to the IRGs** (example: an online copy or by distributing less-costly IRG binders produced using a more succinct font and layout to minimize total pages).
- ➔ **Add two additional categories to the Green Schools Lesson Plan template: *Essential Questions Focused on High-Level Thinking and Assessments*.**
- ➔ **Develop a *Green Schools Program Guide*.**



- The Guide should include big picture/overview/process graphics, *Getting Started* checklists, popular activities (such as energy patrols), and on-going support contact information.
 - A comprehensive, clear, and succinct Program Guide could be created by extracting from existing documents.
 - The Guide should include some essentially turnkey approaches for consideration by Green Teams with significant time constraints.
- ➔ **Add assessments to all lessons correlated to state educational standards that currently lack them; for all assessments, confirm they provide a valid measurement activity for the objectives and standards being taught.**
- ➔ **Develop a clear roadmap for planning an energy audit and environmental instruction for K-12.**
- A preliminary roadmap could be developed prior to lesson reorganization (see the subsequent recommendation) to assist participating schools in the interim prior to the availability of reorganized lessons.
 - Such a roadmap would likely increase consistency and measurability across schools without taking away the autonomy of schools in developing their customized *5-Strand Plans*.
- ➔ **Reorganize the existing lessons into standards-based, grade-specific, mini-units of study that create a spiraled K-12 continuum of energy and environment awareness lessons**, albeit not a fully develop curriculum.
- This continuum of lessons could also include connections to community service and service learning options for students, thereby capitalizing on opportunities to bring Green Schools to an increasing number of districts who require service learning hours for graduation⁴³ and may be looking for comprehensive programs.
- ➔ **Considering increasing the availability of SEAT training to each school** through a process of training a small group of people (either one or more key science teachers at the school and/or a district facilities or energy manager), who can then provide on-going training for school teachers and students on the content and processes of the energy audits. Provide audit kits with a lighting meter, volt meter, and temperature gauge to each school.

⁴³ CalServe K-12 Service-Learning Initiative and the Corporation for National and Community Service, Learn and Serve America. California Department of Education (<http://www.cde.ca.gov/ci/cr/sl/index.asp>).



- Key science teachers are those whose subject content is most closely aligned with the Green Schools content, namely: 3rd grade for the Energy & Electricity unit; 6th grade for Earth Science; 8th grade for Physical Science; and 9th-12th grades for Earth Science, Integrated Coordinated Science, Physics, or Engineering.
- This approach would reduce the LPL time needed to help schools that did not receive the training and LPL time spent loaning out and picking up audit kits. Effectively delivered SEAT training provided over time by district staff or science teachers could reduce the uneven success in energy savings and conservation among schools with differential access to the training, and make it possible for schools to monitor the year-long effectiveness of energy-reducing initiatives in conjunction with energy-tracking data.

→ **Continue the already strong use of research-based instructional strategies as new lessons are developed.**

Recommendations for the program website include:

→ **Add or improve navigational tools.**

- Include a site map on the home page.
- Add a drop-down menu to the left column navigation bar so, as audiences roll over their links, the contents are revealed.
- Make it easier to access *Teacher Links*.
- Improve the pathway bar at the top of each page to assist browsers wanting to return to a previous page.

→ **Activate existing, non-functional links to resources described on the *Green Schools Resources* page.**

→ **Bring clarity, efficiency, and conciseness to website** by doing the following:

- Reduce the number and redundancy of categories in a commonly appearing right column *Resources*.
- Reduce the redundancy in document titles.
- Synthesize information on various similar pages to make a comprehensive presentation.

→ **Categorize lesson plans by similar content and grade level**, rather than what appears currently to be chronological by date-of-creation.

→ **Describe more, and in more detail, the activities of current and past Green Schools.** Post the *PowerPoint* presentations created for End-of-Year Celebrations and articles



crafted from the yearly *Students Leading the Way* publication. Acquire through contests or other means photographs and videos of Green Teams in action and post these.

→ **As they become available, post a *Green Schools Program Guide* and a revised IRG.**

What Edison Might Do to Improve Program Effectiveness

Edison can increase Green Schools' effectiveness by developing and implementing a strategic plan for the recruitment and support of districts that implement Green Schools. Elements of this plan should include the following:

→ **Recognition that district support for Green Schools:**

- **Greatly contributes to principal support for Green Teams**, to shared energy savings – which motivates the entire school community – and to concrete assistance provided by district facility directors and energy managers
- **Often builds incrementally over time** and needs to be maintained over time in spite of shifting district priorities and staff turnover
- **Can be built from three directions: activities of the program implementer, activities of the Green Teams, and Edison activities**

→ **Given the above factors, develop a strategic approach that targets a few districts at a time and moves to new districts as existing ones are either well established in the program or have demonstrated a lack of support.**

- The strategic approach should seek to attain high saturation of Green Schools within the districts that have strong, supportive facility or energy managers.
- Given the importance of the sharing of energy cost savings to Green Team success, the EARTH Schools program manager might problem-solve with districts not sharing savings in an effort to make cost-sharing occur. The districts may not be sharing savings based on technical considerations – such as confidence in the savings estimates – that Edison might address, or they may need an additional “sweetener” that Edison can provide, such as assistance identifying projects that would qualify for an Edison rebate.
- Targeted districts can be selected to meet Edison's objectives for geographic and socioeconomic diversity.

→ **Leverage all of Edison's resources to support district energy efficiency.**

- Collaborate with Edison's commercial managers to identify how Edison might leverage the Green Schools Program in general, and its audit component specifically, to facilitate energy-efficient facility upgrades. Relevant programs include incentive, audit, retrocommissioning, and partnership programs.



- Collaborate with the account representative department to enlist their support for the energy efficiency efforts at participating districts.
- Promote Edison’s Customer Technology Application Center (CTAC) to facility and energy managers in participating districts and encourage them to get on CTAC’s distribution list for course announcements.
- Work with districts on energy policies. The policies might address a single issue or provide an entire roadmap for the district. Edison’s role might be to acquaint districts with Edison’s support for the *California Energy Efficiency Strategic Plan*, offer them examples of energy policies adopted by other districts, and have periodic contact with district leaders to encourage policy development.

→ **School districts implementing the share-back feature should be encouraged to continue sharing back energy cost savings through the summer months.**

- Brainstorm opportunities to promote Edison’s residential programs to students’ families, such as providing refrigerator magnets to participating students that say something to the effect of *I am an energy saver* and provide a phone number for residential program offerings.

Program Reporting and Program Performance Indicators

The Edison program manager and the implementation contractor should work together to revise the program status reporting to better describe program activities, outputs and outcomes, and steps undertaken toward continuous improvement.

While the reporting format needs to be able to adequately capture the diversity of activities, outputs, and outcomes across the schools, there is also value in a reporting format that facilitates comparisons across schools. Such comparisons will contribute to Edison’s understanding of program achievements overall – rather than as a sum of desperate elements – and support an analysis and understanding of how school characteristics influence school outcomes.

Per Edison’s request, the following key performance indicators, which tie directly to program logic and goals, are provided for consideration as possible reporting metrics to be included in status reporting. As a sketch of performance indicators for Edison and the program implementer to consider, the following includes metrics that the program implementer already tracks, as well as suggestions for additional metrics.

The specification of program performance indicators comprises three components: specification of a program logic model, specification of performance indicators, and specification of student pre- and post-tests to assess educational effectiveness. These issues are discussed in detail in Chapter 6 and summarized here. Table 7.3 gives an example of what a table of performance indicators might look like.



Table 7.3: Example of Possible Green Schools Performance Indicator Report

POSSIBLE PERFORMANCE INDICATOR	CUMULATIVE-TO-DATE FROM SEPTEMBER 1, 2009 THROUGH:			
	9/30/09	10/31/09	11/30/09	12/31/09
GREEN SCHOOLS OUTPUT INDICATORS				
Percentage of participating schools with established Green Teams				
Number of schools receiving SEAT training				
Number of student attendees at professional development meetings				
GREEN SCHOOLS OUTCOME INDICATORS				
Number of schools whose districts support them with staff assistance				
Number of schools with districts agreeing to share energy cost savings				
GREEN TEAM OUTPUT INDICATORS				
Number of schools having school-wide awareness events				
Number of school-wide awareness events held				
Number of schools having direct-action resource-use reduction efforts				
Number of direct-action resource-use reduction efforts held				
Number of audits conducted				
GREEN TEAM OUTCOME INDICATORS				
Number of teachers using an IRG lesson plan				
Number of students taught an IRG or similar lesson				
Number of schools for which Green Team informed school administrators of no cost/low cost actions identified by audits				
Number of appliances (mini-fridges, microwaves, etc) removed from use				
Number of classrooms using task lighting when occupied only by the teacher				
Number of computers, TVs, and other devices plugged into power strips that are turned off nightly				

Edison will want to know the percentages of participating students that demonstrate:

- ➔ Increased understanding of energy, its uses, and the environmental importance of conserving it
- ➔ Increased knowledge of concrete things they can do to reduce school resource use



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→ Increased knowledge of concrete things they can do to reduce home resource use

These percentages would be estimated annually, comparing the results of short student tests given at Green Schools at the beginning and end of the school year. Such tests do not need to be given to every student in a participating school to assess whether the Green School program offers effective educational resources, but rather can be directed to the appropriate science classes and students of teachers on the Green Team, for example.

Chapter 6 discusses principles for creating such tests. The following gives a sketch of a test that might be given to students in the 3rd through 5th grades, offered for illustrative purposes only. The program implementer is in the best position to judge the key ideas conveyed by Green Schools.

Students are provided definitions for renewable and non-renewable energy:

1. Which of the following are renewable sources of energy? [For 3rd graders: “Circle an item below that is a renewable source of energy”; for 4th graders: “Circle two or more of the items below that are renewable sources of energy”]
 - a. Dynamite
 - b. The sun
 - c. Horses
 - d. Oil
 - e. Coal
 - f. The wind
2. Which of the following use non-renewable energy? [Similar variants by grade level as above]
 - a. Cars, trucks, and airplanes
 - b. Sports
 - c. Walking to a friend’s house
 - d. Heating buildings with gas or oil
 - e. Light bulbs
 - f. Batteries
3. Which of the following are things you can do at home to help conserve the earth’s resources [Similar variants by grade level as above]
 - a. Help your parents or other adults
 - b. Turn off things when you leave the room – TVs, lights, games, computers



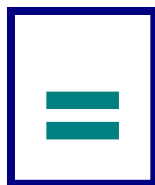
- c. Take out the trash
- d. Never put clean clothes in the pile to be washed
- e. Take short showers
- f. Keep your room neat and clean

Recommendations for Future Research

The Green Schools Program might benefit from the following research:

- ➔ An investigation of the program from the perspectives of participating school custodians – soliciting custodians’ in-depth views on benefits of Green Schools participation and barriers to Green Schools’ performance – for the purpose of developing strategies to further custodian participation.
- ➔ An investigation of Green Schools’ performance as a primarily one-year program. While performance indicators will provide as assessment of Green Schools’ accomplishments, in-depth interviews with Green Teams would provide a deeper understanding of the program’s successes and barriers as a primarily one-year program.
- ➔ An investigation of teachers’ use of the IRGs and suggestions they have for IRG modifications that might increase teacher usage of the IRGs.





SECTION 2: LIVINGWISE[®] PROGRAM

CHAPTER 8: LIVINGWISE[®] PROGRAM AND PROJECT BACKGROUND

CHAPTER 9: LIVINGWISE[®] INTERVIEW FINDINGS

CHAPTER 10: LIVINGWISE[®] RESOURCES REVIEW

CHAPTER 11: LIVINGWISE[®] WEBSITE ASSESSMENT

CHAPTER 12: LIVINGWISE[®] REPORTING AND PERFORMANCE INDICATORS

CHAPTER 13: LIVINGWISE[®] CONCLUSIONS AND RECOMMENDATIONS



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SECTION 2: LIVINGWISE® PROGRAM



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PROCESS EVALUATION OF THE 2006-2008 EARTH EDUCATION & TRAINING PROGRAM



LIVINGWISE[®] PROGRAM AND PROJECT BACKGROUND

PROGRAM DESCRIPTION

LivingWise[®] is an educational program developed and implemented by Resource Action Programs[®]. During the 2006-2007 and 2007-2008 academic years, 281 schools in 98 school districts in Edison's territory taught the LivingWise[®] curriculum to approximately 52,000 students in 568 classrooms. This accomplishment exceeds the goal – put forth in the *Program Implementation Plan* – to reach 40,000 students between 2006 and 2008, and meets the revised program goal of 40,000 to 65,000 students.

The implementer, in its Teacher Guide, describes LivingWise[®] as a:

“...hands-on program [that] teaches the importance of water, energy, and related environmental issues in your community. The program includes materials that teach students important lessons about energy and water, how we use each in our everyday lives, and why it is important to conserve.”

The program comprises lessons in six topic areas, implemented through a Teacher Guide and a Student Guide. The topic areas are:

- **Natural Resources**
- **Water**
- **Natural Gas**
- **Energy (including electricity)**
- **Conservation**
- **Conservation At Home**

Teachers can cover the six topics – each in a single lesson or over multiple lessons – by conducting the activities included in the Teacher Guide. The *Conservation At Home* topic includes home activities for students using a kit of conservation items; students might complete them over the course of a week.

The teacher materials include: a guide; a chart correlating the LivingWise[®] content to California State Education Standards; classroom posters; a set of seven additional activities to augment the lessons (available in English and Spanish); a program video for students; and two items discussed further below – letters to parents about the program and data collection instruments. At the bottom of every page of the Teacher Guide is a banner providing a phone number and website address teachers can access to get additional support.



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In addition to a Student Guide, each participating student receives: a *Home Energy & Water Use Workbook*; a *LivingWise® Activity Kit* of energy- and water-saving tools, and products for the student to extend the classroom learning to his or her home; a *Certificate of Achievement*; and a coupon for a free *Get Wise* wristband. The kit is assembled in a box that clearly identifies a phone number to call for additional assistance; affixed to the inner lid of the box is a label identifying Edison and the other program sponsors, in addition to other information.

The materials in the kit vary somewhat from year to year, as the program implementer works within the program budget and responds to Edison's directives. The program implementer sent to the evaluation team the kit used in the 2008-2009 school year containing the following items:

→ **Measurement and Installation Tools**

- Flow Rate Test Bag
- Teflon Tape
- Mini Tape Measure
- Digital Thermometer

→ **Energy and Water Conservation Devices**

- High Efficiency Showerhead (Oxygenics brand)
- Kitchen Aerator
- Bathroom Aerator

→ **Water Conservation Devices**

- Three-in-one Drip Cup
 - Lawn/Rain Gauge and Drip Irrigator
- Toilet Leak Detector Tablets

→ **Energy-Saving Devices**

- Compact Florescent Bulb (23-watt ENERGY STAR®)
- Air Filter Alarm (FilterTone® Alarm)

→ **Conservation Information**

- *Natural Resources Fact Chart*
- *Temperature Settings for Summer Cooling and Winter Heating* (in Spanish and English)
- Cold Water Magnets (in Spanish and English)
- Reminder Stickers (in Spanish and English)



- *Turn Off Light*
- *Turn Off the Computer*

➔ **Incentive Information**

- Business Reply Post Card: *Parent Feedback*
- Business Reply Post Card: *Evaluator Phone Survey Agreement Form* and \$10 Gift Card Offer
- Post Card Reminder – *Return Completed Scantron® and Earn a Free Wristband!*

Students, with help from their parents, install the devices in their homes and complete home audit reports (termed *Home Check-Up* and discussed further below). The program theory assumes parents become more informed about resource efficiency by helping their children install the items in the kit and complete the associated assignments, and, as a result, take advantage of opportunities for conservation in their homes.

The program is supported by the *GetWise* website (www.getwise.org), designed for teachers and students.

LivingWise® incorporates several surveys that the program implementer uses to assess program achievements. One of these is a ten-question survey for teachers entitled *Program Evaluation* that obtains their feedback and asks for the total number of students participating in the program. This latter element provides a validation of the teachers' initial estimates of the number of students to whom they would teach LivingWise®. A double-sided second sheet – a Scantron® form – collects data from students and their parents. It includes a ten-question *Pre Survey* and *Post Survey* (one on each side of the sheet) designed to assess student learning, a 13-question *Home Check-Up* survey, and a 23-question *Home Activities* survey. Teachers administer the *Pre- and Post-Surveys* during class time; the teacher materials include survey answer keys. The *Home Check-Up* solicits demographic and home energy use data, such as the number of children in the home and the main source of heating fuel. The *Home Activities* survey explores which of the items in the Activity Kits the family installed, requests data on water flow rates associated with the showerhead and aerators, and poses program assessment questions such as “Did your family change the way they use energy?” and “How would you rate the LivingWise® Program?”

The teacher also receives for each student a letter for parents, explaining the program and soliciting their help in installing the items in the Activity Kits. The letters are available in English and Spanish. Last year, the program implementer began printing the letters on a neon paper stock to attract attention. The letter is double-sided, with the backside presenting a *Parent Checklist* to track their installation of the items in the kit and with a bold label stating the monetary savings they can expect to see from each installation.

The EARTH Schools program manager is a visible proponent of LivingWise®, frequently visiting participating schools. The program implementer offers all schools the option of initiating the program with a presentation for teachers and students. The presentation lasts between 30 and



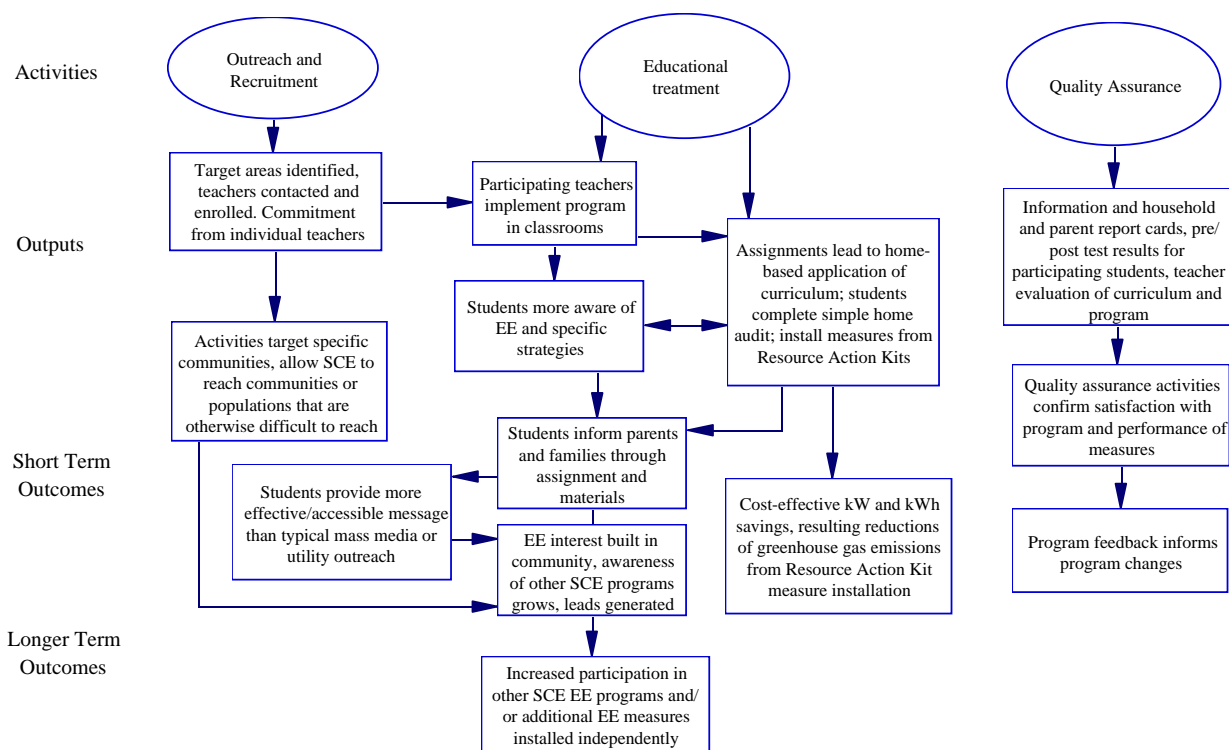
45 minutes, depending on the number of questions asked of the implementer. The EARTH Schools program manager may attend the presentation with the program implementer or may visit schools at other times during the teaching of LivingWise®.

The program implementer offers LivingWise® at locations throughout the country, as well as other educational programs for children and adults that focus on resource use. Edison first offered LivingWise® (as a third-party initiative) in the 2000-2001 academic year. Edison collaborates with the Southern California Water Company and the City of Torrance Public Works Department to fund the water-saving component, and with Southern California Gas. The 2006-2008 Edison budget for LivingWise® was \$2,342,000.

PROGRAM THEORY AND LOGIC MODEL

Research Into Action, under contract to Edison's evaluation staff, developed a logic model and program theory for LivingWise® in December 2007 (Figure 8.1), prior to the launch of the CPUC impact evaluation for the program. Appendix C provides the program theory document.

Figure 8.2: LivingWise® 2006-2008 Program Logic Model



Due to time constraints, program performance indicators for the logic model links were not developed at that time. Edison staff and its contractor developed both the logic model and program theory in consultation with the program implementer, as well as with the Edison



program manager, and both of these parties accepted the model and theory as accurate representations of the program at the time they were developed.

UPCOMING PROGRAM CHANGES

As of the time of this writing, the following changes are under consideration for the LivingWise® Program for the 2009-2011 program cycle.

- ➔ **For the 2009-2011 cycle, the program will place more emphasis on Workforce Training and Development** (see Chapter 1, *Introduction*), according to the request of the California Public Utility Commission as part of its planning efforts to align programs with the California Statewide Strategic Plan. However, students will continue to receive the resource-saving kits, as the kits are an integral part of the hands-on curriculum; the program implementer described the kits as a “key catalyst for the learning process.”
- ➔ **The contracts for the 2009-2011 EARTH program will include performance requirements** (also mentioned in Chapter 1). Edison will finalize the performance metrics after it receives CPUC approval of its Program Implementation Plan.
- ➔ **Among Edison’s objectives for all of the EARTH Schools components, including LivingWise®, are to increase the number of students served annually by the program per year while reducing costs per school.** For LivingWise®, Edison’s costs per school will be reduced by increased cost-sharing through gas and water utility partnerships.
- ➔ **The EARTH Schools program manager would like to see LivingWise® offered over time to every school with a sixth grade class in Edison’s territory.** The program serves a geographically dispersed region spanning 98 districts in the 2006-2008 period. Although there is currently nothing in the program implementer’s contract with Edison that precludes teachers from participating in the program over multiple years, the program manager prefers that the program be conducted in new schools each year to reach Edison’s goal of market penetration to all districts in Edison’s service territory.

PRIOR PROGRAM EVALUATIONS

First offered by Edison in 2000, one prior evaluation has been conducted for the program:

- ➔ *Southern California Edison Evaluation of 2000-2001 Schools Program*, prepared by Ridge & Associates, August 31, 2001.

This evaluation generated one recommendation:

- ➔ **Use a longer version of the teacher survey, which allows for the collection of more information by which to judge the effectiveness of LivingWise®.**



In addition, an impact evaluation was conducted for Southern California Gas Company's 2001 Third Party Initiative, which included LivingWise® as implemented by Energy Technology Labs. The reference to that impact evaluation is:

- *2001 Third Party Initiative Impact Evaluation*, prepared by Quantum Consulting Inc. for Southern California Gas Company, February 17, 2002, P1945-110.

EVALUATION OBJECTIVES AND METHODOLOGY

Objectives

This assessment addresses the following evaluation objectives, as developed by Edison:

1. Assess the LivingWise® curriculum.
 - a. Assess the alignment of current LivingWise® educational resources with California state educational standards, as this is critical for teacher acceptance of the program.
2. Explore teachers' assessments of the LivingWise® curriculum and Activity Kits in terms of ease of use, quality of content, and ability to engage and motivate students.
 - a. Explore whether teachers' curriculum assessments vary by socioeconomic characteristics of the school communities.
 - b. Explore with teachers whether student response to the LivingWise® messages of *environmental conservation* and *cost savings* vary by socioeconomic characteristics of the schools' communities.
 - c. Explore with teachers their students' responses to the Activity Kits and the extent to which the kits are effective in engaging families in energy conservation. Explore whether barriers to installation of items in the kit vary by socioeconomic characteristics of the school communities.
3. Identify opportunities for improving the student *Pre- and Post-Survey* instruments.

Methodology

To address the research objectives, the evaluation team conducted in-depth interviews in-person and by phone with program staff of Edison (the EARTH Schools manager and his supervisor) and the implementation contractor team, including two managers and one customer service staff. These interviews occurred between May and August 2008.

The evaluation team also conducted telephone interviews with six participating teachers. The six teachers constitute a case study approach to the program. Edison wanted an in-depth look at small samples of participating schools having differing socioeconomic characteristics. The



evaluation team used as a proxy for such characteristics the schools' percentages of students eligible for free and reduced lunches.

The evaluation team researched participating schools' free and reduced lunch percentages by consulting the website *www.greatschools.net*. While the data on this site have inaccuracies, the site arguably provides the best single-source reference for this information across American schools.

The evaluation team specified three free and reduced lunch categories: *low*, defined as 0% to 15% free and reduced lunch; *moderate*, defined as 42% to 58% free; and *high*, defined as 85% to 100% free. The team interviewed two teachers within each category – one that participated in 2006-2007 and one that participated in 2007-2008.

To develop the sample frame, the evaluation team identified roughly six teachers in each of the six categories (three socioeconomic categories by two program years). The team then provided this list to the program implementer, who called the teachers to ask their willingness to participate in the survey research; participants received a \$25 gift card. The program implementer then provided the evaluation team with the names of those teachers willing to be interviewed, along with the telephone numbers the teachers indicated could be used to reach them during the summer. The evaluation team completed six telephone interviews in June and early July 2008, subsequent to the school year – one in each socioeconomic/program year category. The team sent \$50 gift cards to the interviewed teachers.

In addition to these efforts, the process evaluation team wrote about a half-dozen questions to include in the impact evaluation surveys being conducted for the program by The Cadmus Group, Inc.⁴⁴ The impact evaluation team fielded surveys of participating teachers for an analysis of impacts. The impact sample plan specified a sample size of 75 teachers, providing 90% confidence with 10% precision. The impact evaluation team fielded these surveys in the second quarter of 2008. Eleven teachers from nine schools responded to the impact survey.

Appendix I contains the survey instruments.

LIVINGWISE® SECTION ORGANIZATION

The report section on LivingWise® comprises six chapters, Chapters 8 through 13. In addition to this chapter, which provides a brief program description and the evaluation approach, Chapter 9 presents findings from interviews with Edison staff, LivingWise® Program implementers, and participating LivingWise® teachers. Chapter 10 provides a review and assessment of program instructional resources, and Chapter 11 assesses the program website. Chapter 12 discusses

⁴⁴ The Cadmus Group, Inc. was working as a subcontractor to KEMA, Inc., which holds the prime contract with the CPUC to conduct impact evaluations for 2006-2008 programs the CPUC classifies as Specialized Commercial.



program reporting and performance indicators, and Chapter 13 provides conclusions and recommendations.



9

LIVINGWISE[®] INTERVIEW FINDINGS

This chapter presents findings from interviews with Edison staff, LivingWise[®] implementation staff, and participating teachers, organized into the following sections:

→ **Recruitment**

→ **Overall Participant Response to the LivingWise[®] Program**

→ **Feedback on LivingWise[®] Lessons**

- Ease of Use in the Classroom
- Applicability for High- and Low-Performing Students
- Time Needed to Effectively Teach the Curriculum
- Correlation with State Standards
- Language Barriers
- Non-Reading Educational Materials
- Motivations for Program Participation
- Ongoing Student Interest in Topics Related to the LivingWise[®] Curriculum

→ **Feedback on LivingWise[®] Home Activities**

- Assessment of the Activity Kit
- Teacher Demonstration of Home Activities

→ **Feedback on the Data Collection Activities**

- *Home Activities / Home Check-Up Surveys*
- Resource Savings Summary
- *Pre- and Post-Surveys*

→ **Feedback on Ongoing Program Influence**

→ **LivingWise[®] Links to Other Edison Programs**

→ **Monitoring, Reporting, and Continuous Improvement**

- Current Monitoring and Reporting
- Continuous Improvement



research/into/action™

→ Findings from Impact Survey Efforts**RECRUITMENT**

Edison identifies the geographic area in which it wants the program implementer to work. The implementation team then identifies schools in the target areas that have a sixth grade. Finally, Edison approves the final selection of schools to target. Coordination occurs with the water companies serving the schools. This process happens in phases throughout the year, with the program implementer targeting successive areas.

The program implementation team includes a program coordinator who recruits teachers to participate in LivingWise® and provides support to teachers. The program coordinator contacts the targeted schools and learns the names of the sixth grade teachers, possibly their email addresses, and the school schedule, including the days teachers are at school and the times of day they might be available to talk by phone (such as before and after school, and during recess and lunch periods).

The program coordinator places calls to the teachers, at times they are likely to be available, to explain the LivingWise® Program to them and interest them in participating. The coordinator sends a teacher packet and kit to interested teachers, and follows up with them to determine if they plan to use the lessons with their classes and, if so, how many sets of student materials they need. The coordinator then arranges for the materials to be shipped to the teachers.

The program implementer provides teachers with an incentive to return their students' *Pre- and Post-Surveys*. The implementer varies the incentives offered from year to year and in that way learns what incentives are most effective in motivating teachers. In past years, participating teachers have been eligible to win a lottery for such items as a laptop computer or an iPod, or have received gift cards. The program implementer reports that gift cards – a guaranteed reward – seem to have more appeal than the possibility of a larger-value item.

The coordinator discusses with the teachers when they might best teach the lessons. Because the final lesson includes an important take-home component, the coordinator encourages teachers to conduct the lessons prior to scheduled school holidays and breaks. The implementer has learned another good time for teachers to teach the lessons are just after school breaks, as a transition activity. The coordinator lets teachers know they can contact her at any time should they have questions or need assistance.

Participating teachers are asked to complete and return a brief survey to convey their satisfaction with the program (as well as returning the students' *Pre- and Post-Surveys*). On the survey, teachers can indicate whether they want to participate again the next year. If their school is included among those Edison is targeting the following year, these teachers are among the first the coordinator contacts. The coordinator reports, "Before the school year starts, I always get some emails asking if the program will be available or asking to be notified when they can get it. When teachers learn they won't be eligible, they are disappointed, but they understand it's a free



program and has limits.” The program implementer explains that the proportion of teachers that would like to participate again provides a valuable assessment of teacher satisfaction with the program.

OVERALL PARTICIPANT RESPONSE TO THE LIVINGWISE® PROGRAM

Comments from participating teachers regarding the program were very positive. Five out of six teachers interviewed reported that the overall quality of the program was excellent, with the sixth teacher describing it as “pretty good.” Teachers value the hands-on aspects of the program and that it involves parents through the home resource kit.

FEEDBACK ON LIVINGWISE® LESSONS

Ease of Use in the Classroom

The six teachers interviewed for this study felt overall the program materials were professionally produced and easy to use, with some exceptions. The following analysis of the interview results identifies areas of opportunity for the program implementer to improve program materials.

LivingWise® staff offer to give a presentation at each participating school that provides a description of the program and program sponsor, as well as information specific to the school’s region and the utilities that serve the school. While this presentation is generally used to initiate the program, it may be scheduled during or after the program activities, if requested. Teachers can choose whether they would like this presentation; however, two teachers reported not being aware of this option.

- ➔ **Implication: The program implementer should ensure all teachers understand this option is available.**

Applicability for High- and Low-Performing Students

One teacher reported successfully teaching the curriculum to lower-performing students “without any intervention, which is extremely rare,” as well as reporting ease in extending program elements to accommodate higher-performing students. However, another teacher would like to see more examples of how to extend the lessons for higher-performing students and another would have liked a more challenging curriculum.

- ➔ **Implication: The lessons appear to be usable for children with a range of aptitudes; however, findings from interviewed teachers, as well as from the review of LivingWise® resources (see Chapter 10), suggest that the curriculum does not appear to be sufficiently challenging for grade six students.**



Time Needed to Effectively Teach the Curriculum

Most interviewed teachers conducted the lessons over a two-to-three week period. One teacher reported dedicating a total of twelve hours to the program over a three-week period. This respondent explained that three weeks is necessary to provide students with enough time to complete program activities that require parental involvement.

- **Implication: The program implementer should ensure participating teachers are aware that a minimum time commitment is necessary to effectively cover the program curriculum.**

Correlation with State Standards

All six teachers interviewed were satisfied that the LivingWise® curriculum fulfills California Department of Education standards. Teachers reported a high level of student learning resulting from the program. According to one teacher, “I know that the students learned according to the standards, because they were tested and did extremely well.”

More than one teacher reported that the LivingWise® curriculum was sufficient to use in place of the science curriculum for water and energy. However, one teacher reported, “The section on the hydrologic cycle is not connected with the science curriculum.” Indeed, the program implementer has identified no correlations between the lesson on water and grade six standards, and water as a science topic is addressed by grade five content standards.

- **Implication: The program implementer could enhance the curriculum by modifying the water lesson as necessary to correlate it to grade six science standards.** The next chapter offers specific recommendations.

Language Barriers

Three out of the six teachers interviewed reported that language differences present a barrier to communication of program elements to English-as-a-Second-Language (ESL) students and non-English-speaking parents. Teachers believe their students’ families would benefit were the program implementer to provide translations of LivingWise® materials targeted to the students’ families, in addition to the translated parent letter describing the program. One respondent recommended that in addition to the Spanish translation, Mandarin and Vietnamese translations of program materials would be useful.

These findings are at odds with the opinions expressed by program implementers that, because classroom instruction occurs in English, teachers are not interested in materials in alternative languages.

- **Implication: LivingWise® intends to engage parents and students with home retrofits, and in the Edison service territory there are large populations who speak**



one of many languages other than English or Spanish. The next chapter offers specific recommendations concerning language translations.

Non-Reading Educational Materials

In discussing non-reading materials and visual aids, one teacher spontaneously reported that the classroom posters included in the teacher resources are excellent.

Several teachers recommended that the program include additional non-reading-based materials and visual aids. According to one teacher, including more images would “improve understanding of the program, not only among ESL students, but among all students.” Several teachers suggested the program might include audio-visual components, such as short video clips, online images, files in PDF format that teachers could video-project, and content that could be used with interactive whiteboards, known as *promethean boards*.⁴⁵

Teachers also suggested including charts to “supplement program materials,” which would enable teachers to “quickly assess students and what they’ve learned.”

One of the eleven teachers surveyed for the impact evaluation of LivingWise® (see the last section of this chapter) wanted to have more teaching materials or more information, and links provided on the website. (This teacher’s comment is included here as it reinforces themes found from the process evaluation, the principle source of information for this chapter.)

- ➔ **Implication: The curriculum – other than the sixth section on home conservation and optional activities – is delivered as a reading activity with a few optional discussion questions. The curriculum would be strengthened by incorporating additional learning modalities, including interactive activities that appear to be associated with higher levels of student engagement.** The next chapter offers specific recommendations.
- ➔ **Implication: LivingWise® materials lack tools to assess student learning with respect to grade six content standards.** The next chapter offers specific recommendations.

⁴⁵ A *promethean board* is an interactive whiteboard that offers teachers a library of image, background, and annotation resources. It allows computer images from any software program or website to be projected onto a whiteboard, where teachers and students can access, control, and manipulate the program via the board’s touch-sensitive surface. With the software, teachers can annotate in electronic ink over any PC application, web page, or image. They can also use the software’s flip-chart feature in place of traditional whiteboards and chalkboards. In addition, teachers can save lessons, flip charts, and notes to a disc. For more information, see <http://www.thejournal.com/articles/16614>.



Motivations for Program Participation

The evaluation team asked teachers to reflect on whether their students responded most to the LivingWise® theme of environmental stewardship or to the message of energy and water cost savings.

The two teachers from the schools with low percentages of free and reduced-cost lunches (15% or fewer) reported their students are most motivated by the notion of environmental stewardship. The two teachers from the middle socioeconomic group (around 50% free and reduced-cost lunches) reported students were equally motivated by both messages of stewardship and cost savings. Of the two teachers at schools with high proportions of free and reduced-cost lunches (85% or more), one reported the students were primarily motivated by the message of cost savings, while the other reported both messages had equal appeal.

- ➔ **Implication:** While the small sample size of the research cannot firmly support this conclusion, the sample provided suggests the message of cost savings may be more motivating for lower-income students than for higher-income students; the message of environmental stewardship appears to have broad appeal across all socioeconomic groups.
- ➔ **Implication:** Due to the limited anecdotal evidence gathered, further research needs to be conducted to determine what role socioeconomic characteristics of the school population has on student motivations; specifically, whether students' household incomes suggest what messages students find most meaningful – cost savings opportunities, environmental stewardship, or both.

Program implementation staff said they have not conducted any statistical analyses of measure installation rates (as reported by students in the *Home Activities* survey) and the socioeconomic characteristics of the school community; yet, they reported that, “We have learned that more affluent areas do less of the retrofits.” As an example, one staff person mentioned that in 2000, they had a particularly good response to the program among families in a rural area they had targeted.

The program implementer revised the program materials for the 2007-2008 academic year to identify explicitly the money savings households can expect to see from implementing the efficiency measures. Implementation staff reported they received more parent comment cards for this year than they ever received previously. While parent response is still relatively low, the staff believe the increased response suggests the theme of saving money has a significant appeal to parents.

Ongoing Student Interest in Topics Related to the LivingWise® Curriculum

Two teachers spontaneously reported that many students continue, after participation in the program, to explore topics related to the LivingWise® curriculum. For instance, one teacher



reported that several students chose topics such as clean water and recycling when asked to deliver oral reports some time after the LivingWise® lessons: “I could see that that the students had chosen these topics on the basis of the LivingWise® kits.”

Two teachers believe their students are most interested in water quality and water conservation, which they attributed to student awareness of the “drought situation” in Edison’s region.

FEEDBACK ON LIVINGWISE® HOME ACTIVITIES

Assessment of Activity Kit

Teachers unanimously reported that the contents of the *LivingWise® Activity Kits* are the central motivator for student participation and that students enjoy installing energy-saving devices in their homes. According to one teacher, “I thought the kit was more effective than any other aspect of the program.” Another teacher reported, “If it hadn’t been for the kit, I don’t think the students would have gotten that much out of the program. Whenever something includes hands-on activities, students are more responsive.”

- ➔ **Implication: Overall, teacher comments support implementation staff views that the Activity Kits are an integral part of the educational program.**
- ➔ **Implication: The popularity of the kits with students suggests that interactive teaching materials lead to high levels of student engagement.**

The kits distributed to the students of teachers participating in 2006-2007 included, among other items, a CD-ROM game designed to reinforce the program lessons, a lawn rain-gauge cup, and an electroluminescent night light. (For a complete list of kit contents, please refer to the section *Program Description* in the previous chapter.) One teacher thought the sixth grade students considered the game to be “too simple.” Two teachers reported that participants did not understand how to use the lawn rain-gauge cup, suggesting the gauge is not appropriate for their desert climate. One teacher said some students reported that the electroluminescent night light is not bright enough.

The program implementer obtains feedback such as this from teachers through the survey teachers complete to conclude their participation in LivingWise®. The implementer places follow-up phone calls to teachers commenting on the contents of the kit or other aspects of the curriculum to obtain feedback that is more detailed. The implementer then revises the kit contents or the curriculum, as warranted by the number of teachers expressing a similar viewpoint and considerations such as the cost of making the change.

Teacher Demonstration of Home Activities

The program encourages students to replace old showerheads in their homes with resource-efficient models. The Workbook instructs students in how to measure the flow rates of old



showerheads and calculate water and energy savings. Demonstrating use of the flow meter presented a challenge for two teachers because neither sinks nor access to water are available in their classrooms. One teacher successfully addressed this by demonstrating use of the flow meter on a showerhead without the use of water.

Two teachers suggested the program implementer employ a traveling motor home to supplement training on home audits and installation of efficiency measures.

The EARTH Schools manager has arranged for the 2009-2011 program cycle to have Edison's Mobile Education Unit support LivingWise, as well as the other EARTH Schools programs.

According to a teacher from a school serving a low-socioeconomic neighborhood, students installed "light bulbs and other items that are simple to use," but not the "more complicated" items in the Activity Kits. Similarly, another teacher believes that parents who had not received a college education tended to experience difficulty using the tools designed to measure how much water had been saved in their homes. This respondent saw an opportunity to improve the task instructions.

The majority of teachers report that families who rent their homes are not prevented from installation of measures contained in the kits. According to one teacher, "I think renters went ahead and completed the installations without asking for permission." However, one teacher reported that a small number of families who rent their homes are not allowed to install program measures. To address this, the respondent recommended that students install the contents of the kit in a neighbor or relative's home.

According to a teacher from a school serving a high-socioeconomic neighborhood, several students reported that their parents did not install the faucet aerators because the aerators do not fit the specialized "designer" faucet-heads found in many of the homes. This respondent suggested that the program collaborate with businesses to develop an aerator that fits designer faucet-heads. One of the teachers surveyed for the impact evaluation of LivingWise® (see the last section of this chapter) spontaneously indicated that the bathroom faucet aerators did not seem to fit in the new homes. (This teacher was one of eleven surveyed and so the comment, coupled with the comment from one of the six teachers interviewed for the process evaluation, suggests this experience may be common.)

The other teacher with high-income students reported that the parents of approximately eight students did not allow the installation of the energy-efficient showerheads, either because they "wanted more flow" or because they were not satisfied with the showerhead's appearance.

Two teachers reported that a small number of parents did not use the toilet leak detector tablets provided in kits. One student's parents were concerned about the tablets staining their newly purchased toilets; another student's parents did not use the tablets because of the family's use of "blue-colored chemical cleaner," which they assumed would prevent the tablets from working properly.



According to program implementation staff, the households in lower-income areas install more of the measures in the kit than those in higher-income areas. Yet lower-income areas include more rental housing, which can be a barrier: “So we do best with middle America.” Staff have not conducted statistical analyses of installation data to develop a refined understanding of how measure installations vary with the socioeconomic characteristics of the school communities, yet the data are available to support such analyses.

→ **Implication: The program implementer might correlate the installation rate for each measure at each school with the proportion of the school’s students eligible for free and reduced lunches to understand better how installation rates vary with community affluence.**

Program staff also noted the measures need to be “sold” to households and “every product has a different way to sell it.” For example, the showerheads included in the kits are considered among the best on the market; the materials describe it as a “high efficiency” showerhead rather than a “low-flow” showerhead.

FEEDBACK ON THE DATA COLLECTION ACTIVITIES

Home Activities / Home Check-Up Surveys

Upon completion of the simple home audit and measure installations, students and their families are asked to complete a *Home Activities* questionnaire, comprised of 23 questions, and a *Home Check-Up* questionnaire containing 13 questions. The surveys act as a household “report card” to assess their resource use, verify product installation, provide demographic information, and measure participation rates.

Teachers report that students and families who are generally successful in installing the measures in the Activity Kits are also able to complete the *Home Activities* and *Home Check-Up* questionnaires. Teachers often discuss with students their survey responses during class time, after students have completed the surveys at home with the help of their families.

Resource Savings Summary

Teachers generally require students to calculate savings generated from installed measures on their own and later review these calculations in class. Students calculate the savings, perhaps with parental assistance, using the *Home Energy & Water Use Workbook* and information on what measures were installed (identified in the *Home Activities* survey), pre-installation conditions (such as prior water-flow rates of the shower and aerators, also identified in the *Home Activities* survey), and household characteristics (identified the *Home Check-Up* survey).

Teachers’ responses vary regarding the level of assistance students need to complete the calculations. The two teachers interviewed from schools serving low-income communities reported difficulties with calculating savings. One of these teachers reported that students



required assistance in “setting up the problem,” but once the equation was set up, students performed well. The other teacher reported that his class did not complete the calculations.

- **Implication: The program implementer might revise the directions in the *Home Energy and Water Use Workbook* to increase its usability among students across a wide range of aptitudes.** The next chapter offers specific recommendations.

Pre- and Post-Surveys

Teachers ask their students to complete the ten-question *Pre- and Post-Surveys* before the program is introduced, and then again after program completion. Judging from their students’ surveys, interviewed teachers reported that students gain knowledge through the program.⁴⁶

FEEDBACK ON ONGOING PROGRAM INFLUENCE

Teachers reported that ongoing discussions regarding the benefits of efficiency occur after program participation, most often among low-income participants in response to their increased awareness of cost-savings achievable.

One teacher suggested that ongoing participation in energy efficiency activities would be enhanced if the Edison offered the program over three consecutive years, beginning at the third grade level. According to this respondent, were program implementation staff to offer three years of follow-up, rather than just one year, energy efficiency activities would increase.

Teachers doubted the likelihood that families participate in additional utility-sponsored conservation programs as a result of their experience with the LivingWise® Program. One teacher suggested that demonstrating to parents how to monitor their utility bills for water and energy cost savings achieved through the program would lead to increased participation in energy efficiency programs.

- **Implication: Implementation of Edison’s new “Smart Meters” in households throughout the Edison service territory could have a significant impact on helping to sustain student/family conservation efforts adopted as a result of participation in the LivingWise® Program.**

⁴⁶ While the program implementation contractor maintains electronic reporting documents, as well as an Access database of program data (including student pre- and post-test data), the implementation contractor was unable to readily provide the evaluation contractor with a report from the database documenting change in students’ scores from pre- to post- during the 2006-2008 program cycle. The implementer would need to invest some resources in Access programming to summarize the data in that form. An evaluation of the 2000-2001 LivingWise® Program reported an average pre-test score of 41% and an average post-test score of 56% for the 519 completed pre- and post-tests for that program cycle. Source: *Southern California Edison Evaluation of 2000-2001 School Programs*, conducted by Ridge & Associates, August 31, 2001.



LIVINGWISE® LINKS TO OTHER EDISON PROGRAMS

For the 2007-2008 academic year, LivingWise® promoted Edison's *Summer Discount Plan* (through which Edison puts a smart meter on the home air conditioner for direct load control) on a pilot basis. The *Home Energy and Water Use Workbook* included information on Summer Discount and enrollment forms were included as a mini-activity in 15,000 kits. An incentive accompanied the information: LivingWise® staff would send the household four movie tickets when their meter was installed.

Program implementation staff believe LivingWise® offers the potential to get information to households on other Edison programs. However, regarding the Summer Discount pilot specifically, staff believe the information went out to households too late in the school year to provide a good indication of the potential success of such a recruitment campaign.

Edison staff report they will be looking, during the 2009-2011 program cycle, to increase the extent to which the EARTH Schools programs promote Edison's other programs. LivingWise® implementation staff welcome this approach:

- *“Because LivingWise® gets kids, families, and teachers activated, they become good messengers to the community at large, which hasn't been capitalized on. This program could be a very useful tool for Edison because it offers a grass-roots approach. It offers a conduit to get information to the public and enrollment in energy efficiency, low-income, and demand response programs.”*

Staff also view working with Edison's partnerships, local governments, and nonprofits – such as the Ventura County Regional Energy Alliance – as an “underutilized resource.”

The implementation staff report that the program hosts school events, where awards are given to the teacher or school, and that media staff and local politicians sometimes attend these events:

- *“There are special events, promotions, booths at community fairs manned by kids – local kids – and this really commands peoples' attention.”*

Implementation staff note that cross-marketing Edison's programs through LivingWise® offers the potential for an inexpensive, effective marketing approach. The implementer would incur costs to handle the mail coming from the customer, process the program enrollments, provide Edison with the information, and provide customers with any sign-up incentives, but the vehicle is already established.

- ➔ ***Implication: The LivingWise® Program appears to offer the potential for developing into a strong platform for promoting Edison's residential programs and increasing Edison's visibility in communities with substantial populations of school-age children.***



MONITORING, REPORTING, AND CONTINUOUS IMPROVEMENT

Current Monitoring and Reporting

The program implementer sends Edison's EARTH Schools program manager monthly status reports that provide documentation in support of the program invoice, which is a contract task. The final status report for the academic year, provided in late summer, includes summary data compiled from the teacher, student, and parent surveys into a *Program Summary Report*.

The EARTH Schools manager reported he would like to receive such summary information more frequently than once a year. In particular, the EARTH Schools manager is looking for analyses of the data that provide insight into program performance. Annual reporting of program data is insufficient for the EARTH Schools manager to understand ongoing program performance and identify possible adjustments needed.

Both Edison and implementation staff describe the current form of the monthly reports the implementation manager provides to the EARTH Schools program manager as largely a legacy from decisions made by prior Edison LivingWise® managers. (The current EARTH Schools manager assumed program responsibilities in the first half of 2007; LivingWise® had several Edison managers before his tenure.)

The implementation staff report that they collect a lot of data on LivingWise®, and they would be able and willing to analyze these data in many different ways. For example, in response to questions posed by the evaluator, implementation staff said they would be able to analyze measure installation rates by socioeconomic characteristics of the school communities. As another example, the implementer recently had a custom computer application built for LivingWise® that enables its customers, such as Edison, to log in at any time, pose queries, and pull reports on the status of their program – such as the number of students learning LivingWise® in a given community or the measure installation rate for a specific classroom. The EARTH Schools manager reports the custom computer application is not yet operational, yet he anticipates the tool will be very useful.

→ **Implication: The EARTH Schools program manager and program implementation team should work together to revise the monthly reporting template to make the information more relevant and actionable. The EARTH Schools manager is looking for analyses and interpretations of empirical data.**

The program implementer also stressed the point that, as is true for all tracking systems, the data need to be stored originally in a form that can accommodate the intended analyses and reporting. Thus, the implementer and the EARTH Schools program manager should work together to anticipate the desired reports so that the implementer can revise the tracking system as necessary.



Continuous Improvement

The program implementer obtains feedback from a number of sources and builds on this feedback to continuously improve LivingWise®. Teachers, students, and parents all receive brief surveys to provide their assessment of the program; the teacher and parent surveys request suggestions for improvement. The implementer reads and records in a database each response. At the end of the academic year, the implementer reviews all the information. The implementer gives greater weight to complaints and suggestions made by multiple respondents. For such comments, the implementer calls the respondent to delve more deeply into their experiences and recommendations. From this research, the implementer identifies issues for the curriculum or the program, which the implementer addresses with its advisory board.

The program implementer also convenes twice yearly a California teacher advisory board, plus advisory boards in Texas and Florida (the implementer offers the program in a number of places throughout the country). These boards meet in the fall and spring. The advisory boards look over the LivingWise® curriculum and give feedback on its format, content, and state educational requirements. The advisory boards are comprised of about eight to ten teachers who are using the program in the current year, and a roughly equal number that have used it previously. According to staff, “We try to recruit teachers that have loved the program, as well as those that have hated it.” The implementer invites teachers to come for a weekend day, with lunch provided.

Although the program implementer engages in these continuous improvement activities, the implementer does not formally report to the EARTH Schools program manager on the research, conclusions, or adaptive steps taken. The program implementer makes some decisions, such as changes to the composition of the Action Kit items, in collaboration with the EARTH Schools manager, but overall the manager receives little information from the program implementer on its continuous improvement activities.

If teachers have problems or raise issues about LivingWise® while they are teaching it, the program coordinator (who recruited the teachers) answers questions and resolves problems. The coordinator alerts the program director as to any ongoing issues and those are addressed at a programmatic level by staff and in the semi-annual meetings with stakeholders.

Consultants to the program implementer annually update the chart correlating the curriculum to state standards, as the curriculum, the standards, or both, are likely to change from one year to the next.

According to the program director, “I have the philosophy that we can’t be satisfied; there is always room for improvement. We look at the curriculum, the layout and format, the technologies included in the kits, and how we recruit teachers.” The director described recent changes in the kit items made in response to teacher feedback: a higher-wattage CFL; a digital thermometer that replaced the previous temperature card; the behavioral messages on the stickers and magnets; and “for several years a common comment was the font was too small, so we increased the book size to accommodate a larger font.” As another example of a recent



enhancement, the implementer now prints the parent letter on neon yellow paper so that students and parents might more readily notice it among a student's many school papers.

One of the teachers surveyed for the impact evaluation of LivingWise® (see the subsequent section) spontaneously indicated that the new Workbook “was much easier for the students to use” than the prior Workbook (this teacher had taught LivingWise® for several years).

→ **Implication: The program implementer appears to have a continuous improvement process in place, yet the EARTH Schools manager does not receive reports on the findings and outcomes of this process. It is important that the continuous improvement processes efforts document lessons learned, action items, and follow-up efforts. The implementer should report findings and outcomes to the EARTH Schools program manager on a timely and regular basis using a reporting format that is effective for all levels of management involved in the implementation and oversight of the program.**

FINDINGS FROM IMPACT SURVEY EFFORTS

As discussed in Chapter 8, subsection *Evaluation Objectives and Methodology*, the process evaluation team wrote about a half-dozen questions to include in the impact evaluation surveys being conducted for the program by The Cadmus Group, Inc., working as a subcontractor to KEMA, Inc. The impact evaluation team fielded surveys of participating teachers for an analysis of impacts.

Eleven teachers from nine schools responded to the LivingWise® teacher impact survey. As that the sample size is too small to be considered statistically representative of the population of participating teachers, the evaluation team provides the results here as potentially suggestive of the population's responses.

The eleven teachers that responded to the impact evaluation survey all have considerable experience with LivingWise®. The teachers had been teaching LivingWise® for two or more years. All but three of the teachers reported they were among several teachers at their school teaching LivingWise®. All of the surveyed teachers reported the intention to teach LivingWise® again the following year.

Teachers judged their students to have considerable enthusiasm for the LivingWise® activities and somewhat less enthusiasm for the LivingWise® curriculum. They rated each, using a 0-to-10 scale, where “0” was not at all enthusiastic and “10” was extremely enthusiastic.

Five of the eleven surveyed teachers rated as “10” student enthusiasm for the LivingWise® activities; the remaining six teachers were equally distributed (two teachers each) among the ratings “9,” “8,” and “7,” for an average rating of 8.9 for the activities.



Three of the eleven teachers rated as “10” student enthusiasm for the LivingWise® curriculum. The ratings “6” and “7” were each indicated by three teachers, and the ratings “8” and “9” were each indicated by one teacher, for an average rating of 7.8 for the curriculum.

Teachers’ open-ended responses to why they decided to participate in the LivingWise® Program conveyed the following ideas (several teachers expressed multiple ideas):

- *I believe in the importance of conservation and believe students need to be aware of its importance (6 teachers).*
- *It incorporates a hands-on approach to teaching conservation and connecting classroom learning to real life; it makes our science program more hands on (4 teachers).*
- *Students need to feel there is something they can do to help “save the earth” [empowerment]; it enables students to look at their own use and determine if they are able to make changes at home (2 teachers).*
- *It involves parents; it’s important to get parents thinking about energy conservation and the environment (3 teachers).*
- *The feedback I received from my parents and students was quite favorable (1 teacher).*
- *It is well aligned with the 6th grade curriculum standards (2 teachers).*
- *It complements another conservation educational program we participate in from the West Basin Municipal Water Treatment Facility (1 teacher).*

A majority of eleven teachers surveyed for the impact evaluation reported the LivingWise® Program met their expectations. They rated each item using a 0-to-10 scale, where “0” was the most unfavorable rating and “10” was the most favorable rating. Six of the eleven teachers reported the program greatly exceeded their expectations (the label associated with a rating of “10”); the remaining five teachers gave ratings ranging from “5” to “9,” for an average rating of “program expectations met” of 8.5.

Teachers gave lower ratings to describe the extent to which they felt supported by the program sponsor. Four of the eleven teachers reported they felt highly supported by the program sponsor (the label associated with a rating of “10”); two teachers responded “don’t know” and the remaining five teachers gave ratings ranging from “4” to “8”, for an average rating of “supported by program sponsor” of 7.7.

Teachers expressed the following themes when asked for final comments:

- *Please continue the program! Even if all the kids do not participate, they are exposed. Thank you (4 teachers).*
- *Great program; well put together. The kids enjoy learning it (1 teacher).*



- *I teach in a lower socioeconomic area and the only way many of my students would have access to light bulbs and water-saving tools is through the kit. Thank you for providing that service for us (1 teacher).*
- *The new Workbook is much easier for the students to use than the prior Workbook (1 teacher).*
- *I would have liked more teaching materials or website recommendations with links to sites providing more information (1 teacher).*
- *The faucet adaptors did not seem to fit in the new homes, especially the bathroom faucet adaptor (1 teacher).*



10 LIVINGWISE[®] RESOURCES REVIEW

This chapter presents the findings from a review of the LivingWise[®]:

→ **Educational Resources**

- *LivingWise[®] Student Guide*
- *LivingWise[®] Home Energy & Water Use Workbook*
- *LivingWise[®] Activity Kit*
- *LivingWise[®] Teacher Edition* (also called Teacher Guide)
- *Teacher Materials Folder*

→ **Professional Development Materials**

- Not Applicable

→ **Implementation Incentives and Processes**

- *Pre- and Post-Survey*
- Program Evaluation
- Parent Packet and Checklist
- Teacher Incentive Flier
- Student Incentive Flier
- Parent Survey Card and (for the 2008 pilot) *SCE Summer Discount Plan* enrollment form

→ **Website Resources** (See Chapter 11 for a detailed analysis of this website)

- *www.getwise.org*

The evaluation team analyzed the LivingWise[®] resources from the following perspectives, elaborated on in Chapter 1:

1. Alignment to California Department of Education content and instructional standards;
2. McREL research-based instructional best practices;
3. Best practices in energy efficiency education and training programs; and
4. Ease of implementation and LivingWise[®] sustainability.



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The information, analysis, recommendations, and implications that follow do not constitute a definitive review of the LivingWise® Program. The evaluation team may have missed some key information. However, the evaluation team assumes that even if information exists, if the team did not find the information in its 40 hours of analysis, then the information is not readily apparent and LivingWise® participants are likely to miss it.

OVERALL ASSESSMENT OF LIVINGWISE® RESOURCES

The evaluators consider the energy and environmental education promoted by the LivingWise® Program to be aligned generally with the specific California content standards for grade six science and mathematics identified by the program implementers. However, it is also the view of the evaluation team that significant opportunities exist for strengthening the LivingWise® instructional materials and strategies to enhance implementation effectiveness.

The evaluation team commends the program implementers for colorful and professional looking materials, clarity of organization, and ease of use, such that teachers can successfully complete the required steps. Generally, the evaluation team is optimistic about the potential of the LivingWise® Program to increase student understanding of energy and water conservation issues, and to encourage actions and behaviors that increase environmental awareness while providing economic savings to families.

DESCRIPTION OF LIVINGWISE® RESOURCES

To provide the reader with context for understanding the evaluation team's assessments, this section describes various LivingWise® resources and is organized as follows:

- ➔ **LivingWise® Sixth Grade California State Standard Correlation**
- ➔ *LivingWise® Student Guide*
- ➔ *LivingWise® Activity Kit and LivingWise® Home Energy & Water Use Workbook*
- ➔ *LivingWise® Teacher Guide*
- ➔ **Teacher Materials Folder**

LivingWise® Sixth Grade California State Standard Correlation

LivingWise® is offered in California to sixth-grade students, typically as part of their earth science curriculum. The program implementers conduct the program in other states and for other grades by customizing the Teacher Guide and Student Guide to different grade levels, based on an analysis of the appropriate standards for the state implementing the program. Specific California grade six science and mathematics standards that correlate to the lessons are printed in the Teacher Guide at the beginning of each lesson, as well as summarized in a chart in the



Teacher Materials Folder. The program implementer revised the 2007-2008 correlation charts in August 2008. Table 10.1 and Table 10.2 provide the revised correlations.

Table 10.1: California State Standard Correlation Chart for Grade Six Mathematics

NUMBER SENSE
2.0 Students calculate and solve problems involving addition, subtraction, multiplication, and division.
ALGEBRA AND FUNCTIONS (Omitted In The August 2008 Revision)
2.0 Students analyze and use tables, graphs, and rules to solve problems involving rates and proportions:
2.1 Convert one unit of measurement to another (e.g., from feet to miles, from cm to inches).
2.2 Demonstrate an understanding that <i>rate</i> is a measure of one quantity per unit value of another quantity.
2.3 Solve problems involving rates, average speed, distance, and time.
MATHEMATICAL REASONING
1.0 Students make decisions about how to approach problems:
1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
1.2 Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed.
1.3 Determine when and how to break a problem into simpler parts.
2.0 Students use strategies, skills, and concepts in finding solutions:
2.1 Use estimation to verify the reasonableness of calculated results.
2.2 Apply strategies and results from simpler problems to more complex problems.
2.3 Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
2.7 Make precise calculations and check the validity of the results from the context of the problem.
3.0 Students move beyond a particular problem by generalizing to other situations:
3.1 Evaluate the reasonableness of the solution in the context of the original situation.
3.2 Note the method of deriving the solution and demonstrate a conceptual understanding of the derivation by solving similar problems.

Table 10.2: California State Standard Correlation Chart for Grade Six Science

HEAT (THERMAL ENERGY) (PHYSICAL SCIENCES)
3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:
a. Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.
b. Students know that when fuel is consumed, most of the energy released becomes heat energy.
c. Students know heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).
d. Students know heat energy is also transferred between objects by radiation (radiation can travel through space).
<i>Continued</i>



ENERGY IN THE EARTH SYSTEM
<p>4. Many phenomena on Earth's surface are affected by the transfer of energy through radiation and convection currents. As a basis for understanding this concept:</p> <ul style="list-style-type: none"> a. Students know the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle. b. Students know solar energy reaches Earth through radiation, mostly in the form of visible light. c. Students know heat from Earth's interior reaches the surface primarily through convection. d. Students know convection currents distribute heat in the atmosphere and oceans. e. Students know differences in pressure, heat, air movement, and humidity result in changes of weather.
ECOLOGY (LIFE SCIENCES)
<p>5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:</p> <ul style="list-style-type: none"> a. Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.
RESOURCES
<p>6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:</p> <ul style="list-style-type: none"> a. Students know the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process. b. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.
INVESTIGATION AND EXPERIMENTATION
<p>7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:</p> <ul style="list-style-type: none"> a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

This chapter assesses the LivingWise® curriculum with respect to the standards given in Table 10.1 and Table 10.2, and refers as well to an additional science content standard:

Ecology 5e: Students know the number and types of organisms an ecosystem can support depend on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

LivingWise® Student Guide

The *LivingWise® Student Guide* is a 37-page, soft-cover reading booklet with a glossary at the end of the text. It is organized with a *Table of Contents* that includes an *Introductory Letter to Students*; six content sections, which are referred to hereafter as *lessons: Natural Resources, Water, Natural Gas, Energy, Conservation, and Conservation at Home*; a *Conclusion* note that introduces the *LivingWise® Activity Kit*; and a *Glossary* of 38 science vocabulary words used



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throughout the lessons. The footer on every odd-numbered page includes the *Get-Wise* phone number and web address.

Each content lesson is labeled with a black header bar, and includes drawings, graphics, and diagrams to augment written descriptions of science concepts. There are a total of 8 diagrams and 29 drawings or graphics to support student understanding. The drawings are very simplistic.

→ **Implication: The drawings do not provide the detail one might expect, given the sophisticated content of the correlated California standards.**

Throughout the Guide, information is tailored to Southern California.

→ **Implication: The references to Southern California conditions serve to increase the relevance of the content to students and encourage them to think about the information in the context of their own lives.**

The text includes approximately 40 questions, typically ending a paragraph as a rhetorical device to introduce the content in the next paragraph. Here are examples from four paragraphs on page seven:

“So, where does our water come from?”

“So how do we have enough water for all these people if it doesn’t come from rainfall?”

“So what happens to water after we use it?”

“How does it get cleaned?”

In each of these examples, the sentences following the question provide the answers.

Each lesson also contains a shaded rectangular box called *Did You Know?*, which connects the content to an example from daily life. The text type is larger than most textbooks (approximately 14 point), which would be typical in the primary grades. Minimal white space is left for students to write ideas, comments, questions, and generally engage with the text, with the exception of two places provided for students to make written responses to the text. Page 19 asks students to check off ways that they use water and page 23 provides three lines on which to write three habits that someone could change to help save water used at their bathroom sink.

Prior to beginning *Lesson One*, students read an introductory page *Welcome Letter* designed to access students’ prior experiences with family conversations regarding the conservation of water and electricity. The letter sets the objective to learn why saving energy and water are important, and introduces the *LivingWise® Activity Kit*, the *Home Energy & Water Use Workbook* (hereafter referred to as the *Workbook*), and the *Scantron®* survey process that the program implementer uses to obtain program performance data. Teachers ask students to complete the *Pre-Survey* portion of the *Scantron®* form.



Lesson One: Natural Resources

Lesson One: Natural Resources, consists of a one-page reading assignment that introduces the vocabulary of natural resources, renewable resources, and non-renewable resources. Teachers have the option of conducting a *Make the Connection* discussion using a story about the resources and energy required to make a hamburger, which is the only suggestion to the teacher for student engagement and processing of the information read.

- **Implication:** To foster a higher level of student cognitive development, Lesson One could be enhanced by suggesting student-engagement ideas such as: 1) Keeping a science journal; 2) Classifying additional examples of renewable and non-renewable resources found in student homes; or 3) Developing a table or graph comparing and contrasting the time required to form various natural resources.

Lesson Two: Water

In *Lesson Two: Water*, students read seven pages of information about water and are introduced to the following 20 vocabulary words: *groundwater, aquifer, potable, non-potable, saline, disperse, evaporation, water cycle, hydrologic cycle, transpiration, condensation, precipitation, recharge, surface water, public water supply, drought, aqueduct, wastewater, reclaimed water, pollution, and natural gas*. The water-cycle vocabulary is a review of California standards for grade five science.

Two graphs and two diagrams are provided to support student understanding of the text and include: 1) a bar graph showing the percent and location of all water on earth; 2) a diagram of the water cycle; 3) a pie chart identifying the percent of public water used by domestic, commercial, public, industrial, and thermoelectric power; and 4) a diagram of the human body and 12 ways water is necessary for the body to function properly.

This lesson has five *Make the Connection* discussion suggestions, four optional *Classroom Activities* and two optional *Additional Activities*, most of which could effectively reinforce the concepts presented in this lesson. The program implementers did not include California grade six standards for this water lesson in the Teacher Guide. No mention is made of the *Water Poster* included in the *Teacher Materials Folder*.

- **Recommendation:** To foster a higher level of student cognitive development, Lesson Two could be enhanced by:
- 1. Positioning the *Make the Connection* content in the Teacher Guide as pre-reading discussions to activate prior knowledge, especially knowledge of the water cycle introduced in grade five science;**
 - 2. Directing small groups of students to generate brainstorm-lists of how water is important to life;**



3. **Linking Lesson Two content to data collection and installation of water-saving devices from the Activity Kit and the Workbook calculations in Activities A-F; and**
4. **Making minor edits to the content of Lesson Two to emphasize the following grade six science standards: Heat 3.a, Energy in the Earth System 4.a, and most importantly, Ecology 5 and 5.e. The ecology standards should then be added to the correlation chart.**

Understanding that human survival globally is dependent on available quantities of energy and water seems, to the evaluation team, to represent the essence of Edison's EARTH Schools Program messaging. Living Wise® has the opportunity in this water lesson to deepen student knowledge introduced in earlier grades and strategically build the argument for conservation (made in Lessons Five and Six) that moves beyond incentives to imperatives for survival. The text makes some mention of real-world examples in California, which reinforces the relevance of the information to California students. However, including additional examples from events around the world could support student understanding of the global nature and urgency of water supply and demand.

Of the six optional activities provided, the *Water Ticket Activity*, which is also included on the back of the *Water Poster*, is an experiential model of the limitation of water resources.

- ➔ **Recommendation: Change the designation of this activity from optional to required (or possibly, highly recommended), thereby establishing the urgency for installing the water-saving devices and changing behavioral habits.**

Lesson Three: Natural Gas

In *Lesson Three: Natural Gas*, students read three pages about the history, distribution, and natural processes by which the gas was formed long ago. A schematic (Diagram 5) is provided showing a simple distribution path from producing well to the customer. A pie chart (Diagram 6) shows the percent and category of users of natural gas in the United States. The text introduces one vocabulary word – *energy*. Students are asked to respond to two *Do You Know* questions positioned in inset boxes with four and five possible answers, one of which the student is directed to circle. The questions ask students how their home and water are heated.

This lesson introduces the idea that current reserves of natural gas will last only 60 years if consumption continues at the current rate. The *Make the Connection* optional discussion questions focus on the differences between heating water with electricity or natural gas, but conservation is not discussed. No *Classroom* or *Additional Activities* are provided and the *Natural Gas Poster* is not mentioned. *Workbook Activity H – Water and Energy: Measure the temperature of your water* – could provide an in-class demonstration and interactive homework assignment to increase student engagement and integrate the information read with concrete action; however, the materials do not direct teachers to do this.



- **Recommendation:** To foster a higher level of student cognitive development, the program implementer could enhance Lesson Three by providing explicit interconnections between the rich resources in the Activity Kit and posters with the reading.

Lesson Four: Energy

In *Lesson Four: Energy*, students read four pages in which they are introduced to five vocabulary words (*photosynthesis, electricity, hydropower, green energy, and conservation*), three of which should be somewhat familiar to students. Pages 14 and 15 define the following types of energy, in alphabetical order: *chemical, elastic, electrical, hydroelectric, light, mechanical, nuclear, solar, and thermal*. The term *elastic energy* is a concept not addressed in California science standards until high school physics.

- **Implication:** *Elastic energy is not pertinent to other LivingWise® content and may confuse sixth graders.*

The text in this lesson is supported by sketches of energy consumers and sources (e.g., iPod, electrical outlet, sun shining on the earth, icon for an atom, wind turbines, and a dam to represent hydro electricity). This lesson includes specific information about Edison's goal of producing 20% of its energy using renewable resources and a pie chart (Diagram 7) showing the percent and type of primary sources currently used to generate electricity in Southern California. Two insert boxes titled *Did You Know* provide statistical facts about the percentage of U.S. population compared to the world (5%) and U.S. energy use (26%), and compares the energy required (16 times more) to produce an aluminum can from raw materials versus recycled aluminum.

Optional Classroom Activities include *Solar Power at Work* (Teacher Guide, page 27) and *Additional Activity A-3: Electrical Generation*. The *Electrical Generation Poster* is not mentioned and this lesson does not provide *Make the Connection* discussion questions. Logical content connections to the Workbook were lacking and might have referenced *Activity I: Refrigerator/Freezer, Activity J: Heating and Cooling, and Activity K: Lighting*.

- **Recommendation:** To foster a higher level of student cognitive development, Lesson Four could be enhanced by shifting the current focus of this lesson from definitions of energy types and sources to strategies that assist students in understanding the similarities and differences between energy sources and their environmental impacts.

Lesson Five: Conservation

In *Lesson Five: Conservation*, students read four pages in which renewable and non-renewable energy is related to CO₂ emissions and global warming/climate change; specific recommendations are given for conserving both electricity and water, and reasons are given why conservation is critically important. Students are introduced to the *Three Rs* of energy-wise



consumers: *Reduce, Reuse, and Recycle*. Optional ideas in *Making the Connection* suggest that students conduct a school survey to determine new ways to conserve and to gather quantitative data about student use of aluminum cans. Teachers can choose to use an optional classroom activity called *Conservation Cookie*.

- ➔ **Recommendation:** To foster a higher level of student cognitive development, Lesson Five could be enhanced by making minor edits to relate the topic of climate change to the curriculum standard Ecology 5.e, which should then be added to the correlation chart.

Lesson Six: Conservation at Home

In *Lesson Six: Conservation in the Home*, students each receive an Activity Kit and a Workbook. Teachers have the option to engage students in *Additional Classroom Activities* entitled *Insulation Test* and *Heat from Light Bulbs*, as well as five *Additional Activities: A-4 – LivingWise® Brain Twisters, A-5 – LivingWise® Poster, A-6 – Natural Resources Fact Chart Challenge, and A-7 – Hidden Message Graph*.

Students read 12 pages designed to prepare them to work with their parents and install conservation devices at home, and additionally make the savings calculations in the Workbook. The text of the Student Guide contains introductory information about twelve different actions that students will complete using the contents of the Activity Kit.

The Teacher Guide suggests that, in a minimum of 20 minutes, teachers will read Lesson Six with students, will show students the related contents from the Activity Kit for all twelve activities, and then send the Kit home for students to work on with families.

The LivingWise® materials state that students work at home over a period of one-to-five days to complete the activities. Yet it also suggests the activities will all be done in a single day, or perhaps in twelve days, because each of the 12 sections direct the student, “When you go home tonight, complete Activity () in your Workbook” (emphasis added).

- ➔ **Implication:** Lesson Six should have minor revisions to provide a more realistic estimate of the minimum class time required and internally consistent references to the time for home activities.

The Teacher Guide makes no mention of follow-up or support to students in completing the calculations in the Workbook. The only direction is for students to return the Workbooks and complete their Scantron® forms.

- ➔ **Recommendation:** To foster a higher level of student cognitive development, the implementer could enhance Lesson Six by directing teachers to engage with students regarding their calculations.



LivingWise® Activity Kit and Home Energy & Water Use Workbook

LivingWise® Activity Kit

The *LivingWise® Activity Kit*, labeled as providing a \$60 value, is essential to successful implementation of the LivingWise® Program. The Activity Kit provides each student with the opportunity to work with family members and make significant retrofit changes to their home. Conducting the activities and installing the devices in their homes extends students' experiences beyond normal classroom scientific experimentation. These real-world applications have the potential to strengthen student conceptual understanding from factual knowledge to application, analysis, and synthesis levels of thinking as they collect data, install devices, and calculate the changes in water and energy use.⁴⁷

The Student Guide introduces each device to be installed; the Workbook gives step-by-step directions on establishing the baseline data, performing the installation, and calculating the changes. For example, students use the *Flow Rate Test Bag* to determine the current amount of water being used by their existing showerhead and bathroom and kitchen faucets, thus establishing the baseline data. The students then install the high efficiency showerhead and bathroom and kitchen aerators, and again use the *Flow Rate Test Bag* to determine the new amounts of water being used.

Students can experience the satisfaction of applying something introduced in school to their personal life, making a cost savings contribution to their family, and affecting the environment by conserving water and electricity.

The Activity Kit contents are described in Chapter 8. The following Activity Kit items are provided with directions in both English and Spanish: the three-in-one drip cup, toilet leak detector tablets, cold-water magnets, and reminder stickers (*Turn Off Light, Turn Off the Computer*)

- ➔ **Implication: The Activity Kit is intended to engage parents and students with home retrofits, and in the Edison service territory there are large populations who speak one of many languages other than English or Spanish.**
- ➔ **Recommendations: The program implementer might ask teachers during the enrollment process what the prevalent languages are that are spoken in their student's homes. In addition, ACS PUMS – the American Community Survey Public Use Microdata Sample File, from the U.S. Census Bureau – might be useful in identifying commonly-spoken languages in addition to Spanish in the Edison service territory. While it is not realistic for the program to disseminate print**

⁴⁷ These categories refer to Bloom's *Taxonomy of Cognitive Development*, which is delineated a subsequent in section *Teacher Guide*, subsection *Lessons*.



materials intended for parents in multiple languages, the program implementer could put translated instructions on its website and teachers could be responsible for accessing the appropriate instructions for second-language students.

LivingWise® Home Energy & Water Use Workbook

The *LivingWise® Home Energy & Water Use Workbook* begins with a short engaging letter of introduction to students and acknowledgement for the understanding they have developed around the importance of saving water and energy. The letter highlights both the money savings available from installing the devices located in the Activity Kit and the need to change habits. Students are asked to complete the *Home Check-Up*. This survey asks students and family members to answer 13 multiple choice and *Yes or No* questions about their home.

Students and their family members spend one-to-five days to complete Activities A-K, which are described below. The Workbook ends with 24 multiple choice and *Yes or No* questions that detail the results of the installation of the devices and the calculations of energy savings. Students bring their Workbooks back to class and complete the *Home Survey* and *Home Check-Up* on Scantron® forms. Students receive an incentive (a LivingWise® wristband) for returning their Workbooks.⁴⁸

Workbook Activities

The *Workbook Activities* are initially introduced to students by reading Lesson Six of the Student Guide. Each activity uses devices from the Activity Kit. The process for each activity involves some aspect of: 1) collecting baseline data; 2) installing a device or adjusting a setting; 3) gathering revised data; and 4) calculating the change in water and energy use. The *Workbook Activities* are:

- ➔ *Activity A: Water in the Shower* – uses the *Flow Rate Test Bag*
- ➔ *Activity B: Saving Water in the Shower* – uses the *Flow Rate Test Bag*
- ➔ *Activity C: Toilets* – uses the toilet-leak detector tablets
- ➔ *Activity D: Bathroom Faucet* – uses the bathroom faucet aerator
- ➔ *Activity E: Kitchen Faucet* – uses the kitchen faucet aerator

⁴⁸ While the program implementation contractor maintains electronic reporting documents, as well as an Access database of program data (including the number of students submitting Scantron® forms), the implementation contractor was unable to readily provide the evaluation contractor with a report from the database documenting student participation rates during the 2006-2008 program cycle. The implementer would need to invest some resources in Access programming to summarize the data in that form.



- ➔ *Activity F: Checking for Unseen Leaks* – uses the drip/rain gauge
- ➔ *Activity G: Watering Outdoors* – uses the drip/rain gauge
- ➔ *Activity H: Water and Energy* – uses the digital thermometer
- ➔ *Activity I: Refrigerator/Freezer* – uses the digital thermometer and appliance reminder stickers
- ➔ *Activity J: Heating and Cooling* – uses a FilterTone® alarm and, for pilot, promotes Edison’s *Summer Discount Plan*
- ➔ *Activity K: Lighting* – uses a CFL
- ➔ **Implication: As true for the Activity Kit, the implementer could strengthen the Workbook by making calculation directions available on the web in alternative languages for families to access.** Recall from the prior chapter, three of the six interviewed teachers reported language was a barrier to households for which English is not the primary language.

Calculation of Water and Energy Savings

The Workbook provides step-by-step directions for completing each activity, A-K. Large boxes are provided for each equation and all related equations for a specific activity are grouped on the same page, facilitating students’ ability to transfer data used in a progressive series of related equations.

Activities vary in where they begin on a page, for example, Activity A starts at the top of page five, Activity B starts in the middle of page seven, and Activity C starts near the bottom of page 9. The one consistent indicator that a new activity is beginning is a gray box entitled *Before You Begin*, which contains three bullets reminding students about safety considerations; however, the label *Safety* is not used.

The Workbook provides drawings of the devices or related materials in all of the activities except for *G – Watering Outdoors* and *K – Lighting*.

State curriculum standards include the expectation that grade six students are able to solve problems that involve multiple steps; however, the evaluation team found the number of steps and symbols used tend toward confusion. Students are also expected to transfer measurements, calculations, and data from the page on which the question is located to the equation boxes one to two pages away. Furthermore, the equation boxes use the activity letter rather than the name of the investigation, making them difficult to distinguish from one another. For example, *Activity A*, on page 6, asks students to transfer answers to locations in equation boxes on pages 7, 9, 15, and 18.



The symbols used in the text, while unique, are similar enough to be confusing. For example in *Activity C*, the 20 symbols used are: *C.1, C.2, C.3, C.4, C.5*, in bold capital letters to distinguish the five equations; gray circles with a white letter and number (*D1, D2, W, L, H1, F1, GF*) to designate data from measurements that must be transferred to equation boxes on different pages; small gray triangles with gray letters and numbers (*T1, T2,*); and a symbol for “the volume of water cubic inches (231 in³ per gallon).” Moreover, if all of this was not challenging enough, students need to watch carefully to see if they have transferred data to the correct page and equation.

Table 10.3 shows for each activity the number of required steps, the number of equations, and the number of different visual symbols used.

Table 10.3: Activity Steps, Equations, and Symbols

HOME ENERGY AND WATER USE WORKBOOK ACTIVITY	NUMBER OF STEPS	NUMBER OF EQUATIONS	NUMBER OF UNIQUE SYMBOLS
<i>Activity A: Water in the Shower</i>	18	2	12
<i>Activity B: Saving Water in the Shower</i>	12	2	7
<i>Activity C: Toilets</i>	19	5	20
<i>Activity D: Bathroom Faucet</i>	15	3	9
<i>Activity E: Kitchen Faucet</i>	15	3	9
<i>Activity F: Checking for Unseen Leaks</i>	6	2	2
<i>Activity G: Watering Outdoors</i>	7	3	10
<i>Activity H: Water and Energy</i>	4	0	2
<i>Activity I: Refrigerator/Freezer</i>	3	0	1
<i>Activity J: Heating and Cooling</i>	6	0	0
<i>Activity K: Lighting</i>	20	5	14

Each step is written out across the full width of the page and, with the exception of *Activity B Steps 1-6*, there are no bold headings to assist students in anticipating what they will do in each step. The steps lack a space or box to record the data prior to transferring it to the equation box. The activities lack a check-off box to help students know what they have finished and to keep track of their progress. The formatting of the pages leaves almost no white space usable to students wanting to create their own systems for organizing their processes.

➔ **Implication: It is evident the program implementer has put a tremendous effort into organizing the students’ process, presumably to minimize the need for teacher involvement. Reducing the demands on teachers likely increases teacher acceptance of the program. However, consider the following implications:**



- **Implication:** The sheer number of steps, equations, and unique symbols have the potential to confuse students and increase the likelihood that students will simply try to follow the steps without understanding why the equations are set up the way they are or why a particular solution requires addition or division.
 - **Implication:** A key missed opportunity is the sixth grade math standard Mathematical Reasoning (1.0 and its components).
- **Recommendation:** To foster a higher level of student cognitive development, the Workbook activities could be enhanced by:
1. Simplifying the calculation format by using fewer symbols to direct students to the correct spot and using the activity name (rather than just its letter) on the equation boxes, so that the answer relates to the original question.
 2. Providing the equation box or a place to record the data on the same page as the question, prior the data transfer to another page.
 3. Provide a check-off box and conceptual headings by the numerous steps so students do not get lost in the process.
 4. Provide comprehension or application questions to reinforce student understanding and provide space for responses and additional reflection.
 5. Determine the best design for the Workbook calculations by investigating students' responses to alternative layouts.

LivingWise® Teacher Guide

The *LivingWise® Teacher Guide* is a 65-page, soft-cover booklet that begins with a letter to the teacher and a two-page *Program Checklist*. Steps one and two of the checklist review the program and teacher materials that should have been received, and step three provides 14 actions to take that explicitly detail how to start the program. The final action on the checklist before beginning the program is to turn to the *Program Completion Checklist* at the end of the Guide, which details 18 final actions that, if taken, ensure the program implementer receives the student surveys (with test and installation data), family enrollment forms in the *Summer Discount Program* (for participants included in the pilot), an *Evaluation of the Program* and *Teacher Enrollment* requests for a future program. The footer on every page of the Teacher Guide provides a phone number and web address for technical support.

The Teacher Guide implementation information is organized around a page-by-page replication of the Student Guide.



- ➔ **Implication:** This feature is in keeping with California Department of Education instructional guidelines, enabling teachers to view exactly what the students are seeing, while the vocabulary and instructional information is also available.

Each of the six lessons can be located easily, with tab-like printed black bars along the booklet's right-hand edge. Within each of the six lessons, the Teacher Guide is organized to provide the information and topics given in the following subsections.

Lessons

Minimum durations of 10 to 20 minutes are ascribed to each of the six lessons. These minimums allow marginally sufficient time for students to read the content, with no time for the teacher to engage the students in either discussion or interactive activities. Time requirements are not provided for the optional activities, nor is there any mention of time for follow-up to the mathematical calculations associated with installing the conservation devices in the Activity Kit.

- ➔ **Implication:** A quick glance at the Teacher Guide could lead a teacher to the conclusion that the basic LivingWise® Program could be completed within 80 minutes of class time.
- ➔ **Implication:** Because the LivingWise® materials include a number of interactive and engaging options that are likely to increase student understanding, it may be useful to the participating teachers to be given a range from the minimum to an optimum duration.

All of the six lessons, seven of the eight optional classroom activities, and one of the seven *Additional Activities* (*Water Tickets*) begin with objectives. The verbs in the objectives reveal the level of cognitive development that the instructional experience is designed to foster in students. The stated objectives are:

- ➔ *Lesson 1: Identify and explain natural resources...*
- ➔ *Lesson 2: To understand water, where it comes from...*
- ➔ *Lesson 3: To understand where natural gas comes from...*
- ➔ *Lesson 4: To develop an understanding of energy in relation to natural resources...*
- ➔ *Lesson 5: Identify and explain conservation, the relationship between and [sic] conservation and natural resources and ...*
- ➔ *Lesson 6: To apply the principals of conservation at home by...*
- ➔ *Classroom Activity 2: Students will observe and describe the changing state of water...*
- ➔ *Classroom Activity 3: Teach students how even a small amount of pollution ...*



- *Classroom Activity 4: Students will investigate how everyday products...*
- *Classroom Activity 5: To demonstrate the use of solar power.*
- *Classroom Activity 6: Students will observe and describe conservation.*
- *Classroom Activity 7: To demonstrate the different types of materials that...*
- *Classroom Activity 8: To demonstrate the difference in energy use between...*
- *Additional Activity 1: To see how decisions affect...*

Professional educators use the term *objectives* to describe student outcomes: what students will know and be able to do by the end of the lesson. Yet the LivingWise® objectives confound what students will know with what teachers will do.

Curriculum designers use Bloom's *Taxonomy of Cognitive Development*⁴⁹, briefly summarized below, as the scale of cognitive engagement. The following list presents the taxonomy starting with the simplest level and moving to the most complex:

- **KNOWLEDGE (Know it):** Recall facts and information
- **COMPREHENSION (Understand it):** Demonstrate your understanding
- **APPLICATION (Use it):** Use what has been learned
- **ANALYSIS (Examine it):** Examine critically, break apart into basic elements
- **SYNTHESIS (Re-organize it):** Put together in a new or different way
- **EVALUATION (Judge it):** Determine worth or value based on criteria
- **CREATION (Invent it):** Develop something new

The six lessons are all designed at the lowest level of cognition: *Knowledge*. Although some of the objectives use the term *understand*, which is given in Bloom's taxonomy as a short-hand for *comprehension*, the lessons do not incorporate opportunities for students to demonstrate their understanding beyond recalling facts and information, which is the definition of *knowledge*, the lowest taxonomic level.

The Activity Kit installations advance student thinking into the application level.

⁴⁹ Bloom, B.S. (1956). *Taxonomy of Educational Objectives, Handbook I: the Cognitive Domain*. New York: David McKay Co Inc. <http://oregonstate.edu/instruct/coursedev/models/id/taxonomy>.



- ➔ **Implication:** The calculations of energy savings could potentially engage students in analysis, but only if teachers engage students in a discussion of and reflection on the results.

The first page of every lesson, except for *Lesson Two: Water*, includes a reference to selected grade six science standards. The program implementer has correlated grade six mathematics standards to the Activities A-K in the Workbook. It is important to note that the standards identified in the Teacher Guide differ from the standards listed in both the original and revised correlation charts; a subsequent section of this report details the discrepancies.

Classroom Activities and Make the Connection Discussion Ideas

All *Classroom Activities* are listed as “*optional... to reinforce the lessons,*” with the exception of the activities for Lessons One and Six, in which the activity directs the teacher to distribute the Student Guides, Workbooks, and the Activity Kits to students. Teachers are provided directions and/or worksheets for nine optional *Classroom Activities*, as well as seven *Additional Activities*, listed below, for a total of 16 possible, but not required, classroom activities. All *Classroom Activities* can be located easily, with tab-like printed black bars along the booklet’s right hand edge.

Student discussion and research suggestions are provided in five *Make the Connection* idea boxes. The ideas are intended to connect the content of the lesson to the real-world experiences of students and include topics like:

- ➔ *The Hamburger Story: What goes into the production of a hamburger?*
- ➔ *Are we drinking the same water that the dinosaurs drank?*
- ➔ *What if the hydrologic cycle stops?*
- ➔ *Desalinization, how hard is it?*
- ➔ *What happens to the human body when it lacks water?*
- ➔ *How else is water important to life?*
- ➔ *Electric vs. natural gas heating: What do you have in your home?*
- ➔ *Create a school survey and find new ways to conserve.*
- ➔ *How much do we use? Counting aluminum cans.*



- **Implication:** Brain research indicates that people learn when they make connections between new information and their prior knowledge or experiences.⁵⁰ These *Make the Connections* inserts have the potential to enhance content understanding for students if the teacher chooses to engage in these optional discussions.

Vocabulary, Important Notes, and Notes Blank Space

A vocabulary bar, shown in brackets with a drawing of a dictionary, is located on the bottom or top of Teacher Guide pages. The bar is a quick reference for teachers to the definitions of 38 words at the point when they are highlighted in the text of the Student Guide.

Successful program implementation and completion is supported throughout the Teacher Guide with strategically placed *Important Note* gray boxes of varying sizes. The font is larger than the normal text and bolded. A white triangle with an exclamation point helps to bring attention to the message inside the box. The messages signal the teacher to review the completion checklist, notice the vocabulary and discussion topics, remind students to return the Workbook, promote (for the pilot) the Summer Discount plan, and complete all of the steps, including returning data to the program implementer.

- **Implication:** The program implementer has clearly defined what it means by successful completion of the program and designed strategic reminders throughout the teacher guide that facilitates program implementation from start to completion by teachers.

Three blank half-page spaces labeled *Notes* are provided, one at the beginning and one at the middle of Lesson Two, and one at the end of Lesson Three. Providing a space for teachers to write their own notes and implementation ideas is very useful. However, it appears to the evaluation team that the program implementer likely added the *Notes* spaces as a solution to formatting and page layout problems, rather than as an educational approach, as four of the six lessons lack this feature.

Home Activities and Additional Activities

The *Home Activities* are in Lessons One and Six, and comprise sending home the *Introduction Letter to Parents* and asking students to complete the Workbook and Activity Kit.

⁵⁰ See, for example, *Teaching with the Brain in Mind*. Eric Jensen, 1998, Association for Supervision and Curriculum Development (ASCD), Alexandria VA 22311. ISBN 0-87120-299-9. Chapter 10, *The Brain as Meaning Maker*, discusses this issue, especially pages 92-93.



Additional Activities are introduced in the *Teacher Materials Folder*; the Teacher Guide contains the *Answer Keys for Additional Activities A1-A7*. The *Additional Activities* are all optional and consist of:

- ➔ **A-1 – Water Tickets:** A game played to show students the importance of using water wisely
- ➔ **A-2 – Mystery Picture Graph:** Points plotted from ordered pairs on a graph making the globe
- ➔ **A-3 – Electrical Generation Chart:** Students study the diagram, list the steps for generating electrical lights, and consider the environmental impact and alternative actions
- ➔ **A-4 – LivingWise® Brain Twisters:** Four logic and calculation problems related to energy conservation and reduced energy costs
- ➔ **A-5 – LivingWise® House Poster:** Students color and draw on the 8 ½” x 11” house hand-out and identify various energy and water use and conservation elements
- ➔ **A-6 – Natural Resources Fact Chart Challenge:** Using the Natural Resources fact chart located in the Activity Kit, students answer four Water Quiz questions and four Energy Cost Calculation questions
- ➔ **A-7 – Hidden Message Graph:** Students match letters to coordinate points and reveal the hidden messages, *Save Water* and *I can make a difference*
- ➔ **Implication:** The content of the *Additional Activities* may prove entertaining to students and certainly adds engagement to the reading activities in the Student Guide. However, with the exception of A-1, and possibly A-3, these activities will not increase student understanding of grade six science standards.

Assessment

The 10 *Pre- and Post-Survey* questions (discussed below), the 13 *Home Check-Up* questions, and the 24 *Home Activity Survey* questions are the only assessment provided in the LivingWise® instructional materials. A thorough analysis of the LivingWise® curriculum by the research team, which included a California science curriculum specialist, determined that these surveys do not provide teachers with the ability to assess student learning of correlated grade six content standards. Subsequent sections elaborate further on this conclusion and provide recommendations.

- ➔ **Implication:** The program implementer should revise the student and household surveys to improve their ability to function as assessment tools for program effectiveness.



Teacher Materials Folder

The *Teacher Materials Folder* includes the following items, discussed subsequently:

- ➔ *California State Standard Correlation Chart*
- ➔ Additional Activities
- ➔ *Pre- and Post-Survey and Answer Key*
- ➔ *Teacher Program Evaluation/Enrollment Form* and Self-addressed Postage Paid Return Envelope
- ➔ National Energy Foundation Posters (*Electrical Generation, Natural Gas, and Water Around Your Home and Community*)
- ➔ Computer Lab Activity

California State Standard Correlation Chart

Teachers received a printed one-page, double-sided correlation table that listed the specific science and math standards addressed by the 2007-2008 curriculum. Three columns were provided that indicated the page number locations in the Teacher Guide, the *Student Activity Book* (which the evaluation team assumes refers to the *LivingWise® Home Energy & Water Use Workbook*), and the *Additional Activities*.

The math correlation page numbers referenced for the Teacher Guide, pages 21-35, were inaccurate and instead are correctly pages 26-43. The identified pages for *Student Activity Book* (pages 16-27) matched neither the Workbook nor the Student Guide. Although the former document does have mathematical calculations on pages 5-32, there are no mathematical calculations located in the Student Guide.

The science standards correlation had similar page number discrepancies for Energy Standard 4.a and the Investigation and Experimentation standards. The correlation chart did not include Ecology standards (5 and 5.a), despite the inclusion of those standards on page 22 of the Teacher Guide. Moreover, nowhere in the materials (either the correlation chart or the Teacher Guide) do the correlations reference Ecology standard 5.e, to which Lessons 2 and 5 would relate, given minor modifications.

The program implementer sent the evaluation team a revised *Standards Correlation Chart*, dated August 12, 2008. The new chart corrects many of the errors mentioned above, but the evaluation team assumes the 2007-2008 participants received the corrected chart after implementing the program. The revised chart now includes a column for the Workbook and indicates Workbook pages on which math standards are addressed. Yet the revised chart indicates the Teacher Guide does not address any math standards and indicates the Workbook does not address any science standards.



→ **Implication: The program implementer can enhance the LivingWise® instructional materials by ensuring all correlations to state content standards are accurate.**

Additional Activities

A directory of seven *Additional Activities* and print-ready copies are provided in both English and Spanish. These activities are referenced in specific lessons of the Teacher Guide as optional activities to help reinforce lesson content and answer keys are provided in the final pages of the Teacher Guide. Teachers can use the *Additional Activities* as stand-alone lessons or possibly as homework.

Neither the directory nor the print-ready copies indicate in which lesson of the Teacher Guide the additional activity is referenced; teachers must locate reference to the activities within the Teacher Guide.

→ **Implication: LivingWise® Additional Activities would be easier to use were they to reference the lessons they complement.**

The purpose of the Spanish version of *Additional Activities* is not clear to the evaluation team, as California schools no longer have a bilingual program for second language learners at the sixth grade level. While the evaluation team has elsewhere in this report recommended that materials intended *for home use* be translated into languages commonly spoken in the homes of Edison's students, it is the team's understanding that *Additional Activities* is intended for classroom use, and California schools do not provide bilingual instruction.

National Energy Foundation Posters

The LivingWise® materials include three highly effective posters, described below, produced by the National Energy Foundation: *Electrical Generation*, *Natural Gas*, and *Water Around Your Home and Community*. Each is a colorful 23" x 35" poster that provides visual images and written information. The visual images are not technically accurate, but instead are an artist's depiction of the ideas.

The posters recommend that teachers photocopy the individual information and activity panels located on the reverse side, prior to displaying the posters. The reverse side of each poster is divided into eight sections 8½" x 11". The sections provide background information for the teacher, and potential student handouts that combine words and illustrations to explain in more detail some of the poster's concepts. Two of the posters identify careers related to the topic (natural gas and water) and two posters include the name, phone number, and web addresses for numerous resource organizations. The posters' reverse sides also include background information about the National Energy Foundation and Acknowledgements.

Item 3 of the *Teacher Guide Program Checklist* suggests displaying the posters in the classroom. This is the only mention of the posters in the entire Teacher Guide.



Electrical Generation describes the energy sources of hydropower, wind, solar, geothermal, fossil fuels (coal, oil, and natural gas), and nuclear energy. The poster also graphically portrays the process of electrical generation using fossil fuels as the energy source that produces heat, turns water into steam, spins the blades of a turbine, and turns the shaft of a generator. The generator's magnet rotates, creating an electric current that is transmitted as high voltage and then stepped down in voltage through transformers and distributed to end-users.

The eight sections on the back of the poster have headings and sub-headings as follows:

- ➔ *Atoms to Electric Current: What is Electricity, Atomic Structure of Matter, Electrons, Conductors and Insulators, Electric Current*
- ➔ *Electric Circuits: Resistance, Magnetism, and Electricity, How Does a Circuit Work?*
- ➔ *Generators and Transformers: Turbines and Generators, What is a Transformer?*
- ➔ *Transmission Systems: Transmission System, Fuel Mix*
- ➔ *Using Renewable Energy Sources: Green Power, Distributed Generation*
- ➔ *Distribution and Management: Geographic Distribution, Load Management*
- ➔ *Efficiency and Safety: Energy Efficiency and Use, Electric Safety*
- ➔ *Electrical Generation: Resources, Acknowledgements*

Natural Gas displays an artist's visual images of an active harbor city, with nearby farming and industry. An oil well and natural gas pipelines are illustrated above a geologic cutaway that models layers of geologic formations deep in the crust. This inquiry-based poster asks students to wonder about five aspects of the natural gas industry and focuses on the people whose career it is to answer the questions posed. The careers are *Environmental Scientist, Supply and Demand Analyst, Pipeline Engineer, Petroleum Engineer, and Geophysicist*.

The reverse side of this poster includes two hands-on student activities. The eight sections and sub-headings on the reverse side are as follows:

- ➔ *How to Use this Poster: Teaching Approach Using This Poster, Standards of Learning*
- ➔ *Have you ever wondered how natural gas is formed and found?*
- ➔ *Have you ever wondered how natural gas is produced and stored?*
- ➔ *Have you ever wondered how natural gas is distributed and used?*
- ➔ *Have you ever wondered how natural gas relates to the community and environment?*
- ➔ *Have you ever wondered how technology will affect the future of natural gas?*
- ➔ *Student Activity: Making Methane from Biomass*



➔ *Student Activity: Curtains for Efficiency*

Water Around Your Home and Community presents images and written descriptions of ten different aspects of water, its use, and treatment by the community. The text provides basic information about the formation of water and the hydrologic cycle. The poster describes the use of water in industry, recreation, agriculture, and for producing hydropower, as well as describing the protection of water quality through wastewater treatment and water purification.

Each section on the reverse side of this poster introduces a simple science experiment in a shaded box labeled *Water Fun*, which is designed to help students explore the concepts. The section headings and sub-headings are as follows:

- ➔ *Water Is Essential: Water is Essential for Life, How Much Water is Available?*
- ➔ *Water and the Elements: The Hydrologic Cycle, Groundwater, Aquifers, Watersheds*
- ➔ *Water and the Elements: Stream Systems, Wetlands*
- ➔ *Water Quality: Nature's Purification System, Water Treatment, America's Clean Water Act*
- ➔ *Water Pollution: Pollution, Point Source, Non Point Source*
- ➔ *Water Efficiency: Saving Water Makes Sense, Efficiency Tips*
- ➔ *Water/Hydroelectricity: Hydropower, Metric Measurement Terms*
- ➔ *Water Careers: Careers in the Water Industry, How to Use This Poster*
- ➔ **Implication: The program implementer should make more effective use of these high quality posters by making specific connections in the Student and Teacher Guides to the visual and written content they provide, and by suggesting student engagement strategies that integrate the posters into the appropriate lessons.**

Pre- and Post-Survey and Answer Key

A blank Scantron® form and answer key are provided, which include on side one the 10 *Pre-Survey* and 13 *Home Check-up* questions. On side two are 24 *Home Activities* and 10 *Post-Survey* questions. The *Pre- and Post-Surveys* comprise identical questions. Four questions (#1, #3, #4, and #7) relate to energy efficiency concepts and two of the devices included in the Activity Kit. Three questions (#2, #9, and #10) test student understanding of water. Two questions (#5 and #6) relate to renewable and non-renewable resources. One question (#8) tests student understanding the use of fossil fuels to produce electricity. Five of the 10 *Pre- and Post-Survey* questions are multiple choice and the remainder are *True/False*. All of the questions require simple, knowledge-level literal and definitional answers (per Bloom's taxonomy). The



questions test student understanding of only a few of the concepts represented in the correlated sixth-grade science standards and none of the concepts in the correlated math standards.

- **Implication:** The program implementer should revise the *Pre-* and *Post-Surveys* to assess student learning of program material correlated to sixth grade science standards, as well learning of energy-saving behaviors.

Teacher Program Evaluation/Enrollment Form and Self-Addressed Postage-Paid Return Envelope

The one-page *Program Evaluation Form* includes a place for the school name and teacher's name, the total number of students participating, and the number of Scantron® forms returned. There are seven opinion questions – rated from *strongly agree* to *strongly disagree* – covering the program materials and activities attractiveness, organization, ease of use by students, support from parents, and *Yes* or *No* responses to having a desire to conduct the program again in the future and the teacher's willingness to recommendation the program to colleagues. Additionally, the survey includes space for the participating teachers to record the things they liked best and something they would change.⁵¹ The *Evaluation Form* is strategically placed on the opposite side of an *Enrollment Form* for future participation. Both forms are highly visible with large bold print and make it easy for the teacher to provide feedback and apply.

- **Implication:** The combination of the *Enrollment* and *Evaluation Forms*, and the self-addressed, postage-paid return envelope appear to the evaluators to be a good strategy for motivating teachers to return the program data. The program implementer was unable to readily provide the evaluators with teacher participation data to corroborate this assessment.⁵²

Technical Support and Implementation Incentives and Processes

All program materials – the Teacher and Student Guides, student Workbook, Activity Kit, Teacher Materials Packet, teacher program evaluation form, and parent letter – all prominently list – on every page, if the item has multiple pages – a toll free phone number (888-GET-WISE)

⁵¹ The implementer reports using these responses in program marketing and in the program's continuous improvement processes.

⁵² While the program implementation contractor maintains electronic reporting documents, as well as an Access database of program data (including teacher participation data, as evidenced by the return of program data), the implementation contractor was unable to readily provide the evaluation contractor with a report from the database documenting teacher participation during the 2006-2008 program cycle. The implementer would need to invest some resources in Access programming to summarize the data in that form.



and a website (www.getwise.org) that users can access to obtain additional support. Chapter 11 reviews the website resource.

All of the teacher, student, and parent materials contain numerous, strategically placed reminders, as well as incentives, to encourage participants to return requested data, comprising:

- ➔ **Pre- and Post-Survey:** Scantron® with return-mail envelope
- ➔ **Program Evaluation and Request Form:** to register for future enrollment opportunities
- ➔ **Parent Packet and Checklist:** Phone Survey enrollment incentive of \$10 gift card
- ➔ **Teacher Incentive Flier:** \$100 VISA gift card for returning 80% of the Scantron® forms
- ➔ **Student Incentive Flier:** Get Wise wristband for returning the Workbook and bubbling-in the Scantron® form
- ➔ **Parent Survey Card and SCE Summer Discount Plan enrollment form:** four free movie tickets upon return
- ➔ **Implication: The program implementer has developed what appears to the evaluation team to be highly effective incentives to induce program completion.** As stated elsewhere, the implementer was unable to provide the evaluator with data to corroborate this assessment.

Computer Lab Activity

This activity was not included in the materials received by the evaluation team.

ASSESSMENT WITH RESPECT TO CALIFORNIA DEPARTMENT OF EDUCATION STANDARDS

The evaluation team assessed the LivingWise® instructional resources and materials with respect to the California Department of Education instructional standards, as discussed in Chapter 1.

Science Content / Alignment with Standards (Category 1)

LivingWise® instructional resources and materials meet four out of the seven sub criteria that comprise the California content/alignment criteria (Category 1) that Education and the Environment Initiative (EEI) instructional materials must satisfy:

- **1.1:** Content is scientifically accurate.
- **1.3:** Examples give direct attention to the responsibilities of all people to create and maintain a healthy environment and to use resources wisely.



research/into/action™

- **1.6:** Explicit instruction in science vocabulary emphasizes the usage and meaning of common words in a scientific context.
- **1.7:** Instructional materials use proper grammar and spelling.

Alignment is good for these standards and is especially strong for Standard 1.3, by bringing “...direct attention to the responsibility of all people to ... use resources wisely.”

An opportunity for enhancing the LivingWise® instructional materials exists in criteria 1.2, 1.4, and 1.5. Each of these standards is discussed in turn.

- **Criteria 1.2: Teaches applicable California Science Content Standards at the intended grade level(s).** The instructional materials address the identified correlated standards. Yet a teacher following the curriculum’s “minimal” expectation of guiding students through reading the Student Guide and sending the Activity Kit and Workbook home for completion will not ensure that the standards are “taught.” The evaluation team further discusses this idea in the section Assessment with Respect to McREL Research-based Instructional Best Practices.
- **Criteria 1.4: Examples include, when appropriate, the historical development of science, its impact on technology and society, and the contributions of minority persons.** Little, if any, mention is made in the instructional materials of historical figures beyond Thomas Edison, minority or otherwise, who have played a role in energy development, conservation, alternatives to fossil fuels, and attempts to protect the environment.
→ Implication: LivingWise® instructional materials can be enhanced by spotlighting the important contributions of individuals and organizations in the area of environmental conservation and protection, as well as careers in which men and women have used scientific thinking to solve critical issues of the time.
- **Criteria 1.5: When investigations and experiments are included, they are integral to, and supportive of, the grade-appropriate physical, life, and earth sciences standards so that investigative and experimental skills are learned in the context of those content standards. The instructional materials include clear procedures and explanations, in the teacher and student materials, of the science content embedded in hands-on activities.** The substance and strength of the LivingWise® Program lies in the Activity Kit and the opportunity provided for students to work with family members and make significant retrofit changes to their home, thereby reducing their use of water and electricity. Home installation of the provided devices extends student experiences far beyond typical classroom experiments and has the potential to strengthen student conceptual understanding beyond basic knowledge to the application, analysis, and synthesis levels of learning.



However the *Standards Correlation Charts*, both the 2007-2008 and August 12, 2008, versions, show no science standard connections to the Workbook. More importantly, the home activities are isolated in Lesson Six, rather than being integrated with the appropriate content in Lessons One through Five.

Program Organization (Category 2)

The evaluation team found the LivingWise® instructional materials to be highly successful in meeting Standard 2.1 and successful in addressing 2.3 of the California criteria for program organization, which require that:

“...the sequence and organization of the EEI instructional units provide clear structure regarding what students should learn in relation to each of the identified content standards and a means for teachers to convey science and history–social science content efficiently and effectively while using the environmental principles and concepts as a context for instruction. The content is organized and presented in a manner that provides:

- 2.1) A logical and coherent structure that facilitates efficient and effective teaching and learning within a lesson, unit, and year and works well in conjunction with the State’s adopted instructional materials in science and history–social science
- 2.3) Explicit statements of the relevant grade-level content standards in the curriculum unit

Program implementers are to be commended for the colorful and inviting presentation and packaging of LivingWise® instructional materials. The organizational strength is evident in: the logical, coherent, and consistent structure of the lessons; the detailed, step-by-step Program Checklists for beginning and completing the program; and the Activity Kit, which is highly organized and supported by both the Student Guide and Workbook. Furthermore, important reminders, incentives, and the Scantron® form for the *Pre- and Post-Survey*, have simplified the role of the teacher and greatly increased the probability that teachers will successfully complete the program.

Opportunities for enhancing the LivingWise® instructional materials exist in criteria 2.2, 2.4, and 2.5.

- **Criteria 2.2: Clearly stated student outcomes and goals that are measurable and are based on the Science and History–Social Science Content Standards and the Environmental Principles and Concepts.** Individual LivingWise® lessons, as reflected in their stated objectives, correspond with the lowest level of cognition: *Knowledge* (know and understand). This level of learning is typically measured by tests and quizzes. The Activity Kit installations advance student learning into the application level, and the calculations of energy savings could be used to assess student learning outcomes.
- **Criteria 2.4: An overview of the content in each lesson or instructional unit that outlines the concepts and skills to be developed.** The Introductory letters to teachers and students provide a limited overview of the content and activities that will be covered throughout the entire program, thus meeting (to some degree) Criteria 2.4.



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- **Criteria 2.5: Support materials that are an integral part of the instructional program, these may include video and audio materials, software, and student Workbooks.** The Activity Kit and Workbook are integral, if not essential, to the program, and yet the program implementer positions them in the Teacher Guide as separate from the classroom work. Other support materials such as posters on Water, Natural Gas, and Energy Generation are provided, but not integrated into instruction.

Assessment (Category 3)

Category 3 criteria state that:

IEEI instructional materials provide: 1) Strategies and tools for continually measuring student achievement including both formative and summative strategies and instruments. 2) Answer keys for all assessment tools.

The LivingWise® Program provides answer keys for all of the *Additional Activities* (3.2). The program also includes a ten-question *Pre- and Post-Survey* set of questions. Yet these items are neither summative nor formative assessments of the content standards.

The program, as it is currently designed, does not ask teachers to discuss, assess, or support students with completing or understanding the Workbook calculations. The only direction is for students to bring the Workbook back to school so they can complete the Scantron® form.

- ➔ **Implication: The Workbook calculations could be used as a formative assessment of following directions, understanding word problems, and computation. One challenge will be that every student in the class will have different answers due to variations in their homes and therefore to make this a graded assessment would be time-intensive for the teacher.**

Universal Access (Category 4)

The Evaluation team found a mixture of strengths and opportunities for improvement in reviewing the LivingWise® instructional materials with the criteria for universal access, which states that EEI instructional materials provide:

- Guidance for teachers in providing access to the content standards and environmental principles and concepts for students below grade level in reading and writing skills, and for advanced learners
- Evidence of adherence to the following design principles for “considerate text” (where applicable):
 - a. Adequate titles for each selection
 - b. Introductory subheadings for chapter sections
 - c. Introductory paragraphs
 - d. Concluding or summary paragraphs
 - e. Complete paragraphs, including a clear topic sentence, relevant support, and transitional words and expressions (e.g., furthermore, similarly)



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- f. Effective use of typographical aids, such as boldface print, italics
- g. Relevant, standards-aligned visual aids connected to the print: illustrations, photographs, charts, graphs, maps
- h. Manageable instead of overwhelming visual and print stimuli
- i. Identification and highlighting of important terms
- j. List of objectives or focus questions at the beginning of each selection
- k. List of follow-up comprehension and application questions

The *LivingWise® Student Guide* is an example of successfully meeting the universal access criteria for students below grade level and second language learners. The titles and subheadings are in bold font, and there are introductory and summary paragraphs with topic sentences and support and transitional words. The Student Guide includes relevant typographical aids along with graphs and some illustrations. The font is large and the vocabulary is in bold type.

The Student Guide is less successful in providing focus questions at the beginning of each lesson. The Teacher Guide has follow-up discussion questions in some lessons, but none of the questions appears in the Student Guide.

The Activity Kit is also an example of successfully meeting the universal access criteria for advanced learners as they could proceed at their own pace and complete the installation and calculations on their own.

The Workbook meets a few of the criteria of universal access and provides significant opportunity for program enhancement across several of the criteria. The Workbook strengths include adequate titles, numbered steps to complete each activity, highlighting of important terms, visual aids in illustrations of the devices to install, and the equation boxes.

The Workbook opportunities for improvement are in universal access criteria 1, 2.b, 2.d, 2.f (too many symbols and typographical aids used), 2.g (especially, relevant science standards), 2.h, and 2.k. For a complete discussion of these elements, see the above discussion of the Workbook.

→ **Implication: Program implementers are encouraged to simplify and visually clarify the Workbook installation steps, and mathematical calculations procedure and format, as recommended above.**

Instructional Planning and Support (Category 5)

The evaluation team found the LivingWise® instructional materials generally to be aligned with the five California education standards relating to instructional planning and support, which are:

Instructional materials must contain a clear road map for teachers to follow when planning instruction. EEI instructional materials must provide:

- 5.1) A checklist of program lessons in the unit materials, with cross-references to the content standards covered, and details regarding the instructional time necessary for all instruction and hands-on activities



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- 5.2) Lesson plans, including suggestions for organizing resources in the classroom and ideas for pacing lessons
- 5.3) Clear, grade-appropriate explanations of scientific concepts and theories; history–social science themes; and environmental principals and concepts; as well as, important events, people, places, and ideas, presented in a form that teachers can easily adapt for classroom use
- 5.4) Lists of necessary equipment and materials for any hands-on activities, guidance on obtaining those materials inexpensively, and explicit instructions for organizing and safely conducting the instruction
- 5.5) If included, homework extends and reinforces classroom instruction and provides additional practice of skills that have been taught

➔ **Implication: The implementer’s efforts to make the program easy for teachers to implement results in a program in general alignment with these state standards.**

The evaluation team identified two areas in particular as opportunities for program improvement related to instructional planning and support. One, LivingWise® lessons all suggest a minimum time of 10 or 20 minutes (standard 5.1). These minimum time indicators are barely adequate for reading the student text and do not allow for any interactive activities, discussion, or writing. Two, and more significantly with respect to alignment with standards, each lesson in the Teacher Guide includes the minimal duration, objective, and names of optional *Classroom and Additional Activities*. This information is important, but not sufficient to be called a “Lesson Plan” (5.2), as virtually no attention is given to instructional strategies. The next section addresses instructional strategies in relation to the McREL research-based instructional best practices.

ASSESSMENT WITH RESPECT TO McREL RESEARCH-BASED INSTRUCTIONAL BEST PRACTICES

Educational researchers at Midcontinent Research for Education and Learning (McREL) published *Classroom Instruction That Works* (2001), which documents nine categories of instructional strategies that have strong effects on improving student achievement.⁵³ Chapter 1 discusses the McREL study and its findings in some detail.

The evaluation team has used the McREL framework to assess the LivingWise® educational materials. In doing so, the team does not mean to imply that each of the instructional strategies should appear in every lesson; rather, one would expect a variety of experiences to be provided and strategies used throughout the instructional materials.

⁵³ *Classroom Instruction That Works*. Marzano, Robert J., Pickering, Deborah J., & Pollock, Jane E., © 2001 McREL. Publisher: The Association for Supervision & Curriculum Development (ASCD). ISBN 0-87120-504-1 1703 N. Beauregard Street. Alexandria, VA 22311-1714 1800-933-2723 <http://www.ascd.org>.



The evaluation team briefly reviewed all 6 lessons in the Student Guide, 13 activities in the Workbook and the related devices in the Activity Kit, and 20 optional activities in the Teacher Guide, including 5 *Making Connections Discussion* suggestions, 8 *Classroom Activities*, and 7 *Additional Activities* for indications that the lessons or activities employ the nine McREL instructional strategies.

Table 10.4 lists the percentage of lessons incorporating each of the nine strategies. In practice, the instructional strategies actually employed in the classroom might vary from those indicated in the guide, based on teacher expertise.

Table 10.4: Use of McREL Research-Based Instructional Strategies in the LivingWise® Materials

STRATEGY NUMBER	RESEARCH BASED INSTRUCTIONAL STRATEGIES	PERCENT STUDENT GUIDE LESSONS USING STRATEGY (6 LESSONS)	PERCENT OPTIONAL ACTIVITIES USING STRATEGY (20 ACTIVITIES)	PERCENT WORKBOOK ACTIVITIES USING STRATEGY (13 ACTIVITIES)
1	Identifying Similarities & Differences	0%	20%	31%
2	Summarizing and Note Taking	16%	30%	0%
3	Reinforcing Effort and Providing Recognition	16%	0%	15%
4	Homework and Practice	0%	10%	92%
5	Nonlinguistic Representations	83%	70%	85%
6	Cooperative Learning	0%	0%	85%
7a	Setting Objectives	100%	50%	92
7b	Providing Feedback	0%	0%	0%
8	Generating and Testing Hypotheses	0%	35%	0%
9	Cues, Questions, and Advance Organizers	16%	50%	54%

Conducting a limited exploratory content analysis, the evaluation team estimated that the nine instructional strategies are incorporated in about one-quarter of the *Student Guide Lessons*, one-quarter of the *Optional Activities*, and 50% of the *Workbook Activities*. Table 10.5 shows the average number of instructional strategies used by each type of instructional material, as well as the lesson or activity that incorporates the highest number of instructional strategies. None of the lessons or activities incorporated all nine instructional strategies.



Table 10.5: Average Use of McREL Instructional Strategies In Each Lesson

INSTRUCTIONAL MATERIAL	AVERAGE NUMBER OF INSTRUCTIONAL STRATEGIES USED	ITEM MAKING GREATEST USE OF DIVERSE STRATEGIES AND NUMBER OF STRATEGIES USED
Student Guide Lessons	2	Lesson 6, used 4 strategies
Making the Connections	2	Connection 5, used 5 strategies
Classroom Activities	3	Conservation Cookie, used 5 strategies
Additional Activities	2	A-1 Water Tickets, used 3 strategies
Workbook / Kit Activities	4	Activities G and J, used 5 strategies

→ **Implication:** There is significant opportunity for the LivingWise® materials to make greater use of research-based instructional best practices.

ASSESSMENT WITH RESPECT TO BEST PRACTICES IN ENERGY EFFICIENCY EDUCATION AND TRAINING PROGRAMS

Chapter 1 identifies best practices in energy efficiency education and training programs.⁵⁴ The evaluation team's assessment of LivingWise® suggests it is relatively strong in the following best practices:

1. Identify the key data required to track and accurately report program activities and success indicators early in the program process if possible; be prepared to adjust databases as refinements become clear. Carefully document the tracking system.
2. Defining and targeting desired behavioral outcomes results in more powerful program effects. Defining the desired behavioral and learning objectives during the curriculum development process helps focus training content on the most important topics. Specificity is important in measuring behavior change.
3. Employ curriculum and content experts and have them work together to assure that the information is presented in an effective format for learning. Sound pedagogical practices must be built-in to training material to ensure that lessons and information are meaningful and communicated effectively.

Yet LivingWise® needs to improve in two aspects of the above best practices:

⁵⁴ *Best Practices Benchmarking for Energy Efficiency Programs*. The study is conducted by prime contractor Itron, Inc. and managed by Pacific Gas and Electric Company under the auspices of the California Public Utilities Commission in association with the California Energy Commission, San Diego Gas and Electric, Southern California Edison, and Southern California Gas Company. www.eebestpractices.com.



- ➔ While it is strong in defining and targeting desired *behavioral outcomes*, it needs to improve its targeting of *learning objectives*.
- ➔ While curriculum and content experts work together to continuously improve the program and the curriculum employs many effective pedagogical practices, the content and practices are limited to the lowest level of cognitive development: *Recalling facts and information*.

A final best practice for efficiency education and training programs – training the trainers – does not apply to LivingWise®, as professional development is not an element of the program.

- ➔ **Implication: The assessment of LivingWise® relative to Department of Education requirements, McREL best educational practices, and best energy-efficiency-education practices yield similar recommendations for program enhancement.**

ASSESSMENT WITH RESPECT TO EASE OF IMPLEMENTATION AND LIVINGWISE® SUSTAINABILITY

Program Requirements

The LivingWise® materials reflect a focus on ease of implementation for teachers, students, and parents (although the Workbook components related to the calculation of water and energy savings does not attain this objective, in the view of the evaluators). Clear, concise, and logical steps are outlined in the *Program Checklists* for both beginning and completing the program. Strategic reminders are placed throughout the Teacher Guide, Student Guide, and Workbook, as well as postcard reminders for students and parents in the Activity Kit and classroom posters. The \$100 incentive to teachers for returning 80% of their student Scantron® forms adds to the desire by teachers to successfully participate.

- ➔ **Implication: The program implementers have clearly defined what they mean by successful completion of the program and designed strategic reminders throughout the program that seem highly likely to ensure that teachers will follow through with ease and experience success.** Again, the evaluators were unable to substantiate this assessment due to lack of accessible data on teacher response rates.
- ➔ **Implication: The program would benefit, however, from improving the calculation instructions in the student workbooks.**

Curricula and Lesson Plans

The content of LivingWise® is targeted and specific. The instructional materials have identified a few key lessons that culminate in the installation of water and energy conservation devices, which become the property of the students and family. The Student Guide is short and easy to



read and, if a teacher chooses the minimal pathway, there is not much to do but to have students return their Workbooks and bubble in their individual results on a Scantron® form.

SUMMARY ASSESSMENT AND RECOMMENDATIONS

The LivingWise® resources have many strengths, including a logical, coherent curriculum, visually attractive materials, and hands-on learning activities. The LivingWise® curriculum has opportunity for improvement, however, with respect to a number of considerations, including use of a variety of instructional best practices, moving students beyond a recall of facts to higher levels of cognitive development, and assessment of learning the correlated science and math standards.

Teachers under the current demands of prescriptive pacing plans and high stakes testing may look at the designation *Optional Activities* and choose the shortest path to completion of the LivingWise® Program. While the program implementers have shown great sensitivity to the differing time and materials constraints of teachers, the evaluation team questions how a *reading only approach* can guarantee student conceptual understanding. The evaluation team speculates that a significant difference between highly successful and less successful teachers is the degree to which they support students in understanding and completing the Workbook calculations and, beyond this, holding classroom discussions to analyze the range of results and comparing and contrasting the variables.

The *LivingWise® Activity Kit* is essential to the success of the program. Therefore, repositioning the Activity Kit installations and Workbook calculations to the center of classroom instruction seems vital to student learning and overall program success.

Ways to improve the substantive learning opportunities afforded by the program include:

1. **Add teacher directions that clearly integrate the Activity Kit with the science content instruction and position the Workbook activities and calculations as a daily homework application.**
2. **Offer more fully developed lesson plans that include instructional strategies and the incorporation of content now positioned as optional.** The program already includes a number of interactive and engaging options that can move teachers beyond coverage and cursory reading to effective student engagement and understanding. As examples:
 - a. Some of the *Making Connections* questions in the Teacher Guide could be used for student writing opportunities or as opening questions to access students' prior knowledge before introducing each lesson.
 - b. Information and activities from The National Energy Foundation posters could be integrated into the Teacher Guide.
 - c. Some of the *Classroom Activities* could be positioned as part of the core curriculum.



- d. Students need opportunities to engage in discussing essential questions and thinking about overarching ideas for which there may be multiple answers. Reflection and the opportunity to process new learning through research and writing are also important. These elements can be incorporated into both the Student and Teacher Guides.
3. **Provide teachers with assessment questions that address the standards and may or may not be included in the data that the program collects.** The *Pre- and Post-Survey* questions, while possibly useful to the program implementer, are neither the formative nor summative assessments of student understanding of content standards that the Department of Education stipulates.
4. **Simplify, as indicated, the Workbook calculations and direct teachers in an approach to discussing the calculations during class time.** Currently, teachers and the program implementer have no way of assessing student accuracy in data collection and success in installing the energy and water saving devices. Further, without classroom instructional time devoted to the calculations, the mathematics in the Workbook falls short of attaining Department of Education standards for “teaching.”

These changes would support numerous Department of Education standards and McREL instructional best practices.

The evaluation team is cognizant that implementing some of the recommendations that bring more rigor to the teaching may make the program more challenging to implement. Teachers may prefer the easier path. Given the significant value of this program and the imperative of the message, as well as the substantial ratepayer investment, the team is of the opinion that strengthening the link between the classroom and home activities is important.





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11 LIVINGWISE® WEBSITE ASSESSMENT

This chapter provides an assessment of the strengths of, and opportunities to improve, the LivingWise®-related websites. The evaluation team employed criteria synthesized and simplified from website assessment criteria proposed by the following organizations:

- The American Library Association⁵⁵
- University of Arizona – AzTEA (Arizona Technology in Education Alliance)⁵⁶
- National Endowment for the Humanities⁵⁷
- Oracle ThinkQuest Educational Foundation⁵⁸

LivingWise® Program participants are supported by and directed to the www.getwise.org website, which, along with WaterWise™ and EnergyWise™, are productions of Resource Action Programs (RAP – www.resourceactionprograms.org). Resource Action Programs also provides information about LivingWise® at www.getlivingwise.org. The *Resource Action Get Wise about Energy and Water Efficiency Blog* (<http://resourceactionblogspot.com>) can be accessed from all three sites. Appendix D provides an 18-page description of these four related web-based resources

The LivingWise® related websites, intended for multiple audiences, will at times be considered as and referred to as one site. The text makes distinctions between the four web locations to the extent necessary for clarity. For the most part, the text reviews the websites through the lens of an educator audience and focuses on the LivingWise® *Getwise.org* site. The text occasionally makes references to the marketing aspects of the corporate website to help clarify context, but this is not be the primary focus of this review. The first two evaluation criteria discussed – for *Organization* and *Presentation* – require that the evaluation team look at the interplay of the

⁵⁵ ALA American Library Association *Great Websites for Kids Selection Criteria*. ALA 50 E. Huron Chicago, IL 60611 Call Us Toll Free 1-800-545-2433
www.ala.org/ala/alsc/greatwebsites/greatwebsitesforkids/greatwebsites.cfm.

⁵⁶ Dr. Alice Christie's *AzTEA Arizona Technology in Education Alliance Exemplary Website Awards* evaluation rubric. See <http://www.west.asu.edu/achristie/webaward/rubric1.html> and <http://www.west.asu.edu/achristie/webaward/rubricp.html>.

⁵⁷ National Endowment for the Humanities *About EDSITEMent: Website Selection Criteria*
http://edsitement.neh.gov/about_criteria.asp.

⁵⁸ Oracle ThinkQuest 2009 *Website Evaluation Criteria*
<http://www.thinkquest.org/competition/website/evaluation.html>.



related websites, while the criteria of *Educational Program Information and Content* and *Curriculum* necessitate a focus more specifically on the *Getwise* site and *Teacher Lounge* pages.

The website assessment is organized into discussions of the following criteria:

- **Organization**
- **Presentation**
- **Philosophy and Academic Standards**
- **Audience**
- **Educational Program Information and Content**
- **Curriculum**
- **Technical Aspects**
- **Media Use**
- **Written Language Mechanics**
- **Sensitivity**
- **Originality**

Each discussion begins with a summary of optimal website characteristics relating to the criterion, against which assessments of the LivingWise® websites are made. Following this listing of optimal characteristics, the evaluation team provides an assessment of the strengths of the LivingWise® websites, followed by the opportunities for improvement, based on the optimal characteristics.

SYNOPSIS OF ASSESSMENT

The evaluation team found the websites and content provided to be attractive, engaging, and informative resources for the various audiences. The LivingWise® related websites and blogspot demonstrate superior strength in their overall organization, presentation, media use, and originality. The evaluation team commends them for consistency, clarity, and ease of use.

The evaluation team also identified some opportunities for enhancement, which it believes can support this set of web resources in becoming even more useful to the educational and local communities. Some of the opportunities identified include the following:

- Consider re-positioning the *Resource Action Get Wise about Energy and Water Efficiency Blog* (<http://resourceactionblogspot.com>) more prominently on the



Getwise.org site so students, parents, and teachers can access the resources provided and develop the interactive flow of information anticipated with a blog.

- ➔ Consider updating or removing the GetLivingwise.org site and merging any useful information to an appropriate spot on either the GetWise or RAP sites.
- ➔ Demonstrate understanding of the rich diversity of languages in California communities and consider providing on-line Activity Kit information, savings estimates, and installation directions in multiple languages.
- ➔ Consider ways to visibly increase sensitivity to the diverse ethnic heritage of the students and teachers of California by including photos representative of the overall ethnic demographics.
- ➔ Most significantly, provide links to quality curricula resources that support and reinforce the LivingWise® lessons. Specifically, curricula that support the following aspect of the stated RAP.org site Mission:

“... Our personalized education approach is truly unique. By using hands-on learning, **accommodation to different learning styles**, adaptive lesson plans, and flexible time schedules, there is something to be gained by everyone involved. Our main priorities are teaching the value of clean water and energy, where our resources come from, the impact of everyday actions and the power of individual and collective action.”

The evaluation team saw evidence of the hands-on learning and the focus on the value of water and energy. The message of taking individual responsibility for actions based on conservation was present in all of the reviewed materials. However, little evidence was found to support different learning styles and the adaptive lesson plans were not adaptations based on student need, but primarily adapted around the amount of time a teacher would take and whether or not they would choose to include the interactive experiences. The lessons require students to follow step-by-step directions, rather than develop their ability to formulate scientific questions or pose solutions to real world problems.

EVALUATION CRITERIA: ORGANIZATION

- The site’s design and layout make it easy to use.
- The *Home* page provides a site map or logical structure for exploring an area of interest.
- Every page is visually well organized.
- Content organization holds the reader’s attention and eases transition between sections.
- Site allows for an active, constructive relationship to the content (e.g., search, blog, forum, wiki).



- Contact information, name of site, and revision date are provided on each page.

Organizational Strengths

- ➔ Organization is one of the strongest attributes of all three websites. Consistent headers, navigation bars, columns, and tabs make *getwise.org*, *getlivingwise.org*, and *resourceactionprograms.org* accessible and easy to use. *RAP.org* includes a site map link on every page.
- ➔ Every page is colorful and employs photos, images, icons, and visual representation to clarify pathways, links, interactive experiences, and processes.
- ➔ Content is organized in short, informative chunks, with clear pathways to and from areas of interest for each specific audience and with multiple pathways from various pages to access information.
- ➔ Every page includes clear identification and contact information. Copyright dates, and privacy policy are included, but only the blogspot indicates revision dates.

Organizational Opportunities

- ➔ **Consider including a search feature**, as none of the three sites have search capability.
- ➔ **Add site maps to the *GetWise.org* and *Getlivingwise.org* sites.**
- ➔ **Consider making the *Blog* more accessible from the *Getwise.org* site.** The blog is inviting, well organized, and informative on conservation issues and current “green” events. The corporate site homepage and all pages at *www.resourceactionprograms.org* include a tab for the blog on the header navigation bar. Access to the blog on the teacher and student site *www.getwise.org* is not shown on the home page. The link is found after opening the *Teacher’s Lounge* and the *Blog* is not one of the main tabs in the navigation bar. In a cursory analysis of the *Blog*, it appears to have started in the spring of 2008 and the postings appear to be made primarily by RAP employees. The *Blog* currently appears to be more of an informational news spot. The evaluation team wonders if the program implementer has chosen to limit the postings, or if the *Blog* is simply new and not well-placed on the *Getwise.org* site, and therefore underutilized. An opportunity exists to position the site more prominently, so both students and teachers can access the resources provided and develop the interactive flow of information anticipated with a blog.

EVALUATION CRITERIA: PRESENTATION

- The website is clearly identified and found easily through a *key word* search.
- The overall layout is clear and easy to follow.



- Content and program characteristics are provided in text and visually.
- Backgrounds and text work together and do not interfere with the ability to easily read content.
- Graphical elements are used consistently.
- Colors, fonts, and layout are creative and artistic.

Presentation Strengths

- ➔ The evaluation team conducted a variety of searches and found that in a search for “LivingWise,” the second through eighth listings on the first Google page were all related to RAP or the GetWise websites. When the key words *energy conservation*, *water conservation*, *energy conservation in schools*, and *energy conservation at home* were used, there was no reference to *LivingWise*, *RAP* or *GetWise* in the first 10 Google pages /100 listings. However, the keywords *energy conservation programs*, *energy conservation for kids*, and *School Programs energy & water* all produced results on the first Google page, between the eighth and eleventh listings.
- ➔ As noted in the previous organization section, each of the four sites lay out in logical and easy to follow formats.
- ➔ The *Getwise.org Home Tour* and *Kids Corner* are particularly excellent at using text and visual elements to help students understand the opportunities for conservation in the home. On the *Getlivingwise.org* site, the *How It Works* presentation is exceptionally clear in its use of text and visual graphics to detail the ten steps required to implement the LivingWise® Program.
- ➔ The graphical elements, visuals, colors, fonts, and white space are used consistently and effectively. In all cases, except for two pages (detailed below) on the *Getlivingwise.org* site, the background and texts work to enhance the readability, interest, and artistry of each site.

Presentation Opportunities

- ➔ **The three unique, but related, websites may lead to some confusion for interested participants and are potentially even more confusing for potential program sponsors.** The program implementers may want to include in the site maps a schematic that shows the related sites and the audiences for whom they are intended. There are already links between the sites at various locations, but the interrelationship is not always clear or consistent.
- ➔ **It appears that the *getlivingwise.org* site may be an earlier version of the current corporate site.** *Getlivingwise.org* looks as though it has not been updated since possibly



2006 and currently has technical errors on the *Videos* and *Print Media* pages, such that the pages are unreadable and the content is inaccessible. The RAP site already incorporates the *Savings Calculator* and other information on the *GetLivingWise*® site. Therefore, it may be useful to merge any useful information and close the *Getlivingwise.org* site.

EVALUATION CRITERIA: PHILOSOPHY AND ACADEMIC STANDARDS

- The purpose of the website is stated and evident in the content of website.
- Academic content is linked to state standards.
- Links to sponsoring organizations are provided.
- The *Acceptable Use Policy* for the site is clearly stated for all audiences.
- Copyright guidelines, permissions, and public domain notifications are followed.

Philosophy and Academic Standards Strengths

➔ The goal and mission of these three websites seems to have evolved over time from one primarily focused on *products* to a greater emphasis on *environmental awareness* and *conservation education*. Despite the Mission statements below, the primary focus of the RAP website appears to be as a marketing tool, not an educational resource. Whether the focus is education or marketing, the purpose of environmental awareness and energy and water conservation are clearly evident on each of the websites.

- ***Getwise.org*** states the following goal on their home page:

“...our goal is to help visitors learn ways to conserve water and energy by providing helpful savings tips, links to local resources, and well-designed products.”
- ***Getlivingwise.org*** states:

“Resource Action Programs® are designed to teach families and communities about conservation and increase environmental awareness. The programs are proven, effective, and generate immediate water and energy savings. Every program combines complete implementation services, high quality products and education materials which result in immediate and lasting effects!
- ***Resource Action Programs.org*** *Mission Statement* is as follows:

“Resource Action Programs emphasize conservation education, designed to introduce families to the concept of natural resources, while teaching them the importance of conservation in their daily lives. Our program’s focus is on energy and water awareness, with the goal of education and an increased feeling of environmental responsibility. Our personalized education approach is truly unique. By using hands-on learning, accommodation to different learning styles, adaptive lesson plans, and flexible time schedules, there is something to be gained by everyone involved. Our main priorities are teaching the value of clean water and



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energy, where our resources come from, the impact of everyday actions and the power of individual and collective action”.

- ➔ *Getlivingwise.org* has a privacy and use policy on every page and most pages have a link to the corporate site, with one notable exception being the *Contact* page. *RAP* has active links to privacy policy.

Philosophy and Academic Standards Opportunities

- ➔ **The *Getwise.org* site does not link to the sponsoring organization website, *RAP*.** And, although it shows the copyright date and the words privacy policy, there is no link to a policy statement.
- ➔ **Based on the analysis on the *LivingWise*® curriculum materials, it is clear to the evaluation team that correlations have been made to Grade Six California science and math standards, however the correlations are not available on any of the three websites.** *LivingWise*® is offered throughout all of the United States and there was no evidence of correlation to any of the state standards. The only mention the team found was on the *Getlivingwise.org* site [*About > Education*]: at the bottom of the page, in large type, it says, *State Correlations*; however, there is nothing written below and there are no active links.

EVALUATION CRITERIA: AUDIENCE

- The needs and interests of the communities served are addressed.
- Relevant educational links are provided for the range of communities served.
- Program participants’ work is featured.
- Program activities and projects are featured.

Audience Strengths

- ➔ Teachers’ need for environmental resources is supported by three links to environmental and science/math clearing houses provided at the *Teacher Lounge* on the *Getwise.org* site.
- ➔ The *RAP* site featured in the *Latest News* section an article dated, August 28, 2008, about Audrey Manansala, a sixth grade teacher at Margaret Duff Elementary School, who was honored for her outstanding efforts. A photo of Ms. Manansala and her class is shown at the bottom of most *RAP* pages. No other evidence was found of spotlighting the work of participants. It should be noted that *RAP* information on various locations credits teachers with designing the *LivingWise*® curriculum, but no names are mentioned.



Audience Opportunities

- ➔ **The activities/lessons provided at the *Teacher Lounge* are a repeat of the materials provided in the *Program Instructional Materials*.** Consider providing links to conservation programs which teachers could participate in prior to or following their implementation of LivingWise®.
- ➔ **Provide links to other environmental sites for students and parents.**
- ➔ **The blog spot seems like a perfect place for *RAP* to spotlight the work and accomplishments of participants.**

EVALUATION CRITERIA: EDUCATIONAL PROGRAM INFORMATION AND CONTENT

- All content information relates to the overall educational purpose.
- Program content, processes, and policies are provided.
- Content is expertly presented, as evidenced by the depth of information and supporting details.
- Information is accurate, relevant, and valuable to intended audiences.
- A variety of information sources are used, including primary sources (such as interviews, surveys, personal observations, original artwork, and multimedia recordings).
- Sources are credible, credited, and citations are thorough enough to verify contents.
- Information is current (site has been updated within the last two months).

Educational Program Information and Content Strengths

All three sites provide program content processes and policies. However, the *RAP* corporate site is aimed at marketing to prospective sponsors and, for the most part, will not be considered in this category. *How it Works* on the *Getlivingwise.org* site may be informative to teachers in understanding the implementation process. The *Getwis.org* site is intended to support, and was designed for the student and teacher audiences; it will be the main focus of comments in this category.

- ➔ The content information that is provided is accurate, relevant, and does relate to the overall conservation purpose. The website expertly supports understanding of the program materials as they relate to the contents of the Activity Kit and some of the actions that individuals can take to conserve energy and water.
- ➔ The blogspot regularly updates the content.



Educational Program Information and Content Opportunities

- ➔ **This area provides one of the greatest areas of potential for the program implementers to enhance the educational opportunities of the website content by adding depth of educational information.** The blogspot seems to attempt to do this, but access to it is buried on the *Getwise.org* site and most likely will not be accessed by parents or students. *Past Newsletters* also made some attempt at current data and information, but were targeted at the sponsor audience more than teachers or students.
- ➔ **There is minimal evidence of primary sources**, as described in the criteria above (e.g., interviews, surveys, personal observations, original artwork, and multimedia recordings), other than participant quotes on the *Getlivingwise.org* site
- ➔ **Consider updating the websites more regularly or provide updated information in the footer.** *RAP* last updated the *News* in August 2008 – the time of this evaluation is November 2008. *Getlivingwise.org* has not been updated since 2006 and there is no way to assess when *Getwise.org* was last updated.

EVALUATION CRITERIA: CURRICULUM

- Teacher guides, lessons, and resources demonstrate quality instructional design criteria.
- Best practices of technology use in education are demonstrated.
- A full description of content/program curriculum is provided.
- A full description of outreach activities is provided.
- Unique characteristics of the content/program are clearly evident.
- The website intentionally stimulates local, national, and global awareness, presents action steps, and effectively engages others in addressing the issue and making a difference.
- Diverse viewpoints are provided with clear differentiation between opinion and fact.

Curriculum Strengths

- ➔ Seven *LivingWise*® *Additional Activities* and 15 *WaterWise*™ *Additional Activities* are available for downloading in the *Teacher Lounge* of the *Getwise.org* website.
- ➔ Links are provided to organizations that produce *Environmental Education* curriculum.

Curriculum Opportunities

- ➔ **The activities available for downloading are not lesson plans and do not demonstrate quality instructional design criteria.** They appear to be intended as fun



extras. There is no evidence of curriculum on any of the three websites, except as in a passing reference to the Activity Kits, and it is not clear that the program implementers ever intended the sites to provide curriculum.

- ➔ **This may not be an area for growth, except to provide specific links to quality curriculum** and annotations explaining how the referenced curriculum resource could extend student learning beyond the contents of the LivingWise® Program or be used as a precursor to the LivingWise® Program.
- ➔ **The evaluation team, in this limited review, did not see evidence of diverse viewpoints being presented**, but would expect to find examples in a comprehensive review of the linked websites or archived blog posts or newsletters
- ➔ **Consider providing more links to local, national, and international issues, and to student-designed projects to address energy and environmental issues.** For example, provide a link to the *2007 Presidents' Environmental Youth Awards (PEYA)* – <http://www.epa.gov/enviroed/peya/peya2007.html>), which honors award-winning student projects in each of 10 national regions.

EVALUATION CRITERIA: TECHNICAL ASPECTS

- Printing or downloading documents is fast and easy.
- Links to related sites are appropriate and informative.
- Links are accessible and work effectively.
- Additional software is accessible as needed.
- Graphics are optimized.
- Multimedia resources work properly.

Technical Aspects Strengths

- ➔ PDF documents are available at all three sites and all of the documents tested by the evaluation team downloaded quickly and easily, with the exception of a few noted below.
- ➔ The *Getwise.org* site *Teacher Lounge* offers three links that then provide access to a rich assortment of *Environmental Education* links. The three main links all work and the randomly-selected links tested by the team also worked.



Technical Aspects Opportunities

- ➔ **A majority of downloads are in PDF format; the site should provide a link to Adobe Acrobat software that will enable users to view PDF documents.** There is no user fee associated with such use of this software.
- ➔ **The *Getlivingwise.org Print Media* page has technical errors and none of the documents could be accessed.** Also, on the *Getlivingwise.org* site, some of the newsletters were very slow to download, possibly because of the number of photos and graphics that may need to be optimized. As previously mentioned, the *Getlivingwise.org Videos* page was also non-functional.

EVALUATION CRITERIA: MEDIA USE

- Multimedia (for example, images, audio, video, animation, games, interactive features) is used purposefully to enhance the presentation of information, engage the user more deeply, and demonstrate key concepts.
- Media elements (such as movies, photo essays, digital stories) include a concise written synopsis that deepens understanding of the topic.
- All media elements are essential components creating understanding and/or emotional impact.

Media Use Strengths

- ➔ The LivingWise® message of conservation is effectively supported by the media elements incorporated into the *Getwise.org* site. The *Home* page and *Kids Corner* effectively provide a home and yard tour in which the viewer can select different rooms in a home or areas of the yard, and discover numerous energy and water conservation tips. The *Kids Corner* game, *Hangman* allows students to have fun with a conservation vocabulary.
- ➔ At the *Kids Corner*, the visitor is able to view the *LivingWise®*, *WaterWise™*, and *WaterWise Outdoor™ Activity Kits* and their contents. The selected kit opens, revealing numbers for each item. As each number is clicked on, a photo appears and the visitor can read a short description, including the name, savings estimate, and installation directions for each item. This is a highly effective use of media and may be essential for parents as they support students in using the Activity Kit contents to retrofit their home.
- ➔ The *Getwise.org Local Resources* provides an interactive map of the United States. The visitor can click on their state and a list of links to state environmental resources appears. The team did not test all 50 states, but all of the states tested worked quickly and provided multiple local resources.



Media Use Opportunities

- ➔ While the *Getwise.org Kids Corner* games *Missing Square Puzzle* and the *Blinking Light Sequence* are great examples of media use and may be entertaining, they did not seem to the evaluation team to add content understanding regarding the message of conservation.
- ➔ The *Getlivingwise.org* site *Tools* page shows a link for *Videos*; however, the page has technical difficulty and none of the videos were accessible.
- ➔ The *Getwise.org* and *RAP.org* sites both provide a **savings calculator** which allows the visitor to input specific data on the number of participants, the percent of heat by gas or electricity, the cost per therm, and cost per kWh, as well as the cost per gallon of sewer and cost per gallon of water. The calculator then produces a new table showing the estimated savings for one year and for 10 years, based on the cost for the year 2005. The tool is useful and highly appropriate to the LivingWise® content; however, using the 2005 **data to estimate savings is now almost four years out of date**. Additionally, it would be useful to have the option for a reader to see the formula used to calculate the savings. Currently, the reader inputs the data and clicks *calculate*, and gets a savings estimate, but it is not obvious how the data used resulted in the answer.
- ➔ **Consider setting up media contests, challenges, or expositions across the LivingWise® Program**, which could be photo essays, documentaries, or short videos.

EVALUATION CRITERIA: WRITTEN LANGUAGE MECHANICS

- Writing is concise and easy to understand.
- Grammar and usage are correct.
- Punctuation and spelling are correct.

Written Language Mechanics Strengths

- ➔ This is an area of strength for all four sites. The amount of written information is sufficient to introduce the various articles and publications on each page, and is easy to understand.
- ➔ Based on the evaluator's limited review, the website grammar, usage, spelling, and punctuation seem to be correct.

Written Language Mechanics Opportunities

- ➔ No significant opportunities were identified.



EVALUATION CRITERIA: SENSITIVITY

- Awareness of and respect for the economic, social, and cultural diversity in the communities served is demonstrated.
- Language needs of the communities served are addressed.
- Sensitivity to the special needs of communities served is apparent.

Sensitivity Strengths

- ➔ The *Getwise.org Teacher Lounge* provides a Spanish translation for 15 *Waterwise Activities*.

Sensitivity Opportunities

- ➔ **Include photos representing more of the ethnically diverse communities served.** *Getlivingwise.org* pages made a limited attempt at representing the ethnic diversity of the students and families served in California schools in the photos selected for use. Approximately ten photos of students and teachers are used and many of them are used on multiple pages. All images of teachers appear to be Caucasian. The majority of students in the photos also appear Caucasian, with one or two Latinos, no Asians, and possibly one African-American student. The *RAP* site does include a group photo of an award-winning teacher and her students, who are predominately Latino. The *Getwise.org* site includes only a few cartoon-type drawings of children, who appear to be Caucasian.
- ➔ **Sensitivity to cultural diversity and languages spoken by the communities served is an area of great potential for enhancement on all three websites.** As noted in the evaluation of *Curriculum Materials*, California schools may have many home languages represented. The Activity Kits presented on-line are only described in English, and yet families are expected to participate with their children in the LivingWise® activities. The *GetWise* site could be greatly enhanced by providing information about the Activity Kit contents, energy savings possible, and installation directions in the predominant home languages in California.
- ➔ **Provide information to engage students across all income levels.** The virtual home tour in the *Kids' Corner* section of the *Getwise.org* site is one area that offers particularly strong potential for improvement. The home featured in the virtual tour that the site currently offers clearly reflects a middle-class suburban or rural environment. Children who live in a more urban environment or who come from a different economic background may find it difficult to relate to the suburban or rural home that is displayed. The site could better reach these audiences by offering virtual home tours of apartments or other types of dwelling in addition to the home tour that the site currently offers.



- **In this limited analysis, no specific evidence of sensitivity to the special needs of communities served was identified.** Including information on funding sources/ incentives for school and home retrofitting, and energy-saving resources for high poverty communities, or making it easier to find existing sources for incentives, grants, or initiatives would be useful.

EVALUATION CRITERIA: ORIGINALITY

- The website is creative and original in its approach to presenting the topic.
- Written content, photographs, artwork, and presentations are original work.
- The majority of the content is not paraphrased or copied from outside sources.
- The website structure, design, and style are unique and original.
- The site has special features that attract or engage users.

Originality Strengths

- The *RAP* suite *GetWise Programs and Related Websites* demonstrate uniqueness, creativity, originality, and are extraordinarily engaging to the participants. LivingWise® is to be commended for the high level of originality.

Originality Opportunities

- **Continue to highlight the originality of teachers and schools as they successfully implement the LivingWise® Program.** Include feature articles and descriptions of the school, home, and community outreach activities of the current and past LivingWise® participants. Challenge all schools to go beyond the existing LivingWise® Program and select a few schools highlighting their original work.



12 LIVINGWISE[®] REPORTING AND PERFORMANCE INDICATORS

Edison is seeking monthly status reporting that will provide indicators of program effectiveness and continuous improvement. Interviews with program implementation staff suggest a willingness to work with Edison staff to develop a monthly reporting structure that meets those objectives.

This chapter is organized into two main sections:

- **Current Status Reporting**
- **Performance Indicators**

CURRENT STATUS REPORTING

The LivingWise[®] Program implementer provides Edison with a “monthly report narrative,” as well as a quarterly narrative and an annual year-end summary report. The evaluation team analyzed one of the monthly reports – for June 2008 – to form an understanding of the monthly narrative report’s typical content.

The program implementer also provides Edison with back-up documentation to support its invoices. This documentation is discussed subsequent to the status report.

Status Report Format

The narrative status report comprised four pages and was organized into 14 topics, as follows:

1. Program Description
 - This section is a paragraph that repeats each month.
2. Administrative Activities
 - The subsections in this section describe the month’s activities and thus vary by month.
3. Program Savings
 - This provides a table of net peak kW, net kWh, and net lifecycle kWh for the period and for the academic year to date.



4. Marketing Activities
 - The subsections in this section describe the month's activities and thus vary by month.
5. Direct Implementation Activities
 - This discusses program activities in each of 13 tasks (denoted by section subheadings).
6. Program Performance / Program Status
 - There is a check-box to indicate status – one of three options (*program is on target; program is exceeding expectations; program is falling short of expectations*).
 - A brief explanation is given in support of the status box checked.
 - A table of student participants is provided for the period and for the academic year to date, by sponsorship (Edison, the gas company, the water company).
7. Program Achievements
 - This provides a one-line or several-line statement of achievements relating to two tasks (*Customer Enrollment and Performance of Program Services*).
8. Changes in Program Emphasis, if any
 - Typical statement: “None.”
9. Discussion of Near-Term Plans for the Program over the Coming Months
 - This gives a few sentences on upcoming activities.
10. Changes to Staffing and Staff Responsibilities, if any
 - Typical statement: “None.”
11. Changes to Contracts, if any
 - Typical statement: “None.”
12. Changes to Contractors and Contractor Responsibilities, if any
 - Typically, this is either “None” or a brief statement of implementer response to Edison requests.
13. Number of Customer Complaints Received
 - Typical statement: “None.”



14. Revision to Program Theory and Logic Model, if any

- Typical statement: “None.”

→ **Implication: The current monthly status report does not provide a framework for assessing program effectiveness and continuous improvement.**

Invoice Documentation

In addition to the status reports, the program implementer provides Edison with monthly invoices, supported by applicable program documentation.

Because both Edison and the local water utility fund LivingWise® in Edison’s territory, the program implementer submits separate invoices to Edison pertaining to each water utility for which there is activity for the month. Program documentation in support of these invoices thus is specific to the schools served by each water utility.

Program documentation includes a tabulation of all the survey data received, by survey item. The implementer submits separate files documenting the results of the *Pre Survey*, the *Post Survey*, the *Home Activities* survey, and the *Home Check-Up* survey; each of these files reports the survey data item-by-item. Each file also reports the number of students responding. So, for example, the implementer submitted a file as backup to an invoice dated July 22, 2008, that indicated 512 students had participated in the program during that invoicing period for that water utility. Of the 512 participating students, 342 students (67%) had completed *Post Surveys*. Of the 342 students completing the survey, 88% had correctly answered the first question (concerning efficient showerheads), 98% had correctly answered the second question (concerning geology), and so on.

→ **Implication: The current invoicing back-up documentation does not provide a framework for assessing program effectiveness and continuous improvement.**

PERFORMANCE INDICATORS

A comprehensive review conducted by the evaluation team of program activities, outputs, and outcomes for the 2009 to 2011 program cycle suggests the following indicators for review and consideration by the program management team and implementation staff.

→ **Implication: Performance metrics drive program activity; therefore, Edison should identify the indicators that are most closely aligned with Edison’s primary program objectives – creating awareness, and attitudinal and behavioral changes related to energy conservation and environmental stewardship.**

Possible LivingWise® (Implementer) Output Performance Indicators

Possible LivingWise® output performance indicators include, but are not limited to:



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- ➔ Instructional resources augmented or refined [per improvement goals established at the outset of a year; a *yes/no* indicator of one or more specific improvements or a percentage of planned improvement accomplished]
- ➔ Number of teachers recruited
- ➔ Number of students in teachers' classrooms
- ➔ Number of students in classrooms receiving promotional materials for other Edison programs, by program
- ➔ Number of teachers to which the implementer provided support [per prior agreement on definition of "provided support" – i.e., spoke on the phone, answered email query]
- ➔ Number of community or media efforts [per prior definition of term – i.e., press release]
- ➔ Estimated audience reached through community or media efforts

Possible LivingWise® (Implementer) Outcome Performance Indicators

Possible LivingWise® outcome performance indicators include, but are not limited to:

- ➔ Improvement of program processes [identify improvements]
- ➔ Improvement of instructional resources [identify improvements]
- ➔ Estimate of total kW and kWh delivered annually and estimate of program cost-effectiveness
- ➔ Estimate of greenhouse gas emissions avoided
- ➔ Estimate of increased participation in other promoted Edison programs [assessable through an impact study]
- ➔ Spillover of efficiency measures in students' households and communities [assessable through an impact study]

Possible Teacher Output Performance Indicators

Possible teacher output performance indicators include the following:

- ➔ Number of teachers returning data collection forms
- ➔ Number of data collection forms returned, by type of survey
- ➔ [Additional teacher activities could be self-reported or observed, yet such tracking is not necessary, given the outcome indicators]



Possible Teacher Outcome Performance Indicators

Possible teacher outcome performance indicators include the following:

- ➔ Percentage of students evidencing an increase in knowledge, as evidenced by percentages of correct answers to the *Pre- and Post-Survey* tests
- ➔ Number of students/ percentage of students reporting installing a specified number (for example, five or more) of the kit measures
- ➔ Number of students/ percentage of students reporting their family changed the way they use energy
- ➔ Students continue resource-conserving, no-cost behaviors [assessable through an impact study]
- ➔ Students influence others to reduce home energy use
- ➔ Students' households continue resource-conserving, no-cost/low-cost behaviors and actions [assessable through an impact study]
- ➔ Students' community members continue resource-conserving, no-cost/low-cost behaviors and actions
- ➔ Number of students indicating interest in careers relating to resource conservation

Documentation of Information Supporting Performance Indicators

The program implementer reported that in August 2008 it installed a new program data-tracking and reporting system, and began using the system for its internal reporting. Edison can use a password to access on-line documentation of the results of all program data-collection activities. Data from the site can be downloaded and manipulated by the EARTH Schools program manager.

At the time of this report, the EARTH Schools manager had not used the implementer's new system. The implementation staff reported that, as with any new software system, they anticipate encountering a few programming bugs when Edison initially accesses the system.

As mentioned, the program implementer also stressed the point that, as is true for all tracking systems, the data need to be stored originally in a form that can accommodate the intended analyses and reporting. Thus, the implementer and the EARTH Schools program manager should work together to anticipate the desired reports so that the implementer can revise the tracking system as necessary.



Survey Opportunities to Capture Program Effects

Student Pre- and Post-Surveys

The *Pre- and Post-Surveys* for students are comprised of ten questions addressing natural resources and efficiency.

Chapter 10 recommends that the program implementer better align the *Pre- and Post-Survey* questions with the program curriculum, especially as it relates to grade six content standards. A survey that better tracks the curriculum and correlated content standards will provide a more valid assessment of program educational effectiveness than the current survey.

- ➔ **Implication: Revised Pre- and Post-Surveys would provide data from which Edison could calculate performance indicators for LivingWise® effectiveness in increasing students' knowledge of both the underlying science theory and practical energy efficiency behaviors. See Chapter 13 for suggested survey questions.**

To use the *Pre- and Post-Surveys* as indicators of the effectiveness of the LivingWise® curriculum, one would calculate for each question the proportion of students answering correctly in the *Post Survey* and subtract from that the proportion of students answering correctly in the *Pre Survey*.

For a survey with 10 questions (like the current version), the gain in correct responses for each question could constitute 10 performance indicators; however, the evaluation team does not recommend this approach because one question per indicator does not constitute a statistically significant measure.

Edison is advised to consider the following three recommended performance indicators, to be developed over the first year that a revised survey is being used:

1. **Percentage gain in correct responses for the question with the highest percentage gain.** The question with the highest percentage gain should be included in the reporting, so any change in which question is registering the highest gain is evident.
2. **Number of questions for which the percentage gain in correct responses exceeds a threshold.** The program implementer should select the percentage gain threshold based on an analysis of past responses. The threshold should be high enough to be a good indicator of program achievement, and simultaneously low enough to show room for improvement over time and to enable a comparison of performance across school types and other elements of interest to an assessment of program effectiveness.
3. **Percentage of students for which their Pre-to-Post answers went from incorrect to correct for a threshold number of questions** (such as percentage of students whose response went from incorrect to correct for four or more questions). Again, the threshold should be selected based on analysis of past data to best meet the opposing objectives discussed for item 2, above.



Format of Pre- and Post-Surveys

Currently, the *Pre- and Post-Surveys*, as well as the other student surveys of *Home Check-Up* and *Home Activities*, are printed on a single double-sided Scantron® form, where the *Pre Survey* is at the top of the first side and the *Post Survey* is at the bottom of the second side. While the impulse to make the Scantron® forms simple to distribute to and collect from students is understandable, for the *Pre- and Post-Surveys* to provide data suitable for use in program performance indicators, they should be on separate Scantron® forms. In addition, the *Pre- and Post-Survey* questions are identical in wording, order, and position of the correct response. At a minimum, while the tests are being redesigned, a re-ordering of the questions and correct responses could increase the validity of these questions as measurements of student knowledge rather than memorization.

Home Check-Up and Home Activities Surveys

Home Check-Up Survey

The evaluation team has two comments relating to the *Home Check-Up Survey*.

One, it is the experience of the team that some portion of consumers do not recognize the term *incandescent bulb*. Although this term is explained in the Student Guide and *Home Energy & Water Use Workbook*, the program implementer might consider in Question 13 substituting a word such as *standard* and putting *incandescent* in parentheses.

Two, also in Question 13, the term *CFL's* is used to indicate the plural of CFL. The use of an *apostrophe-s* signifies the possessive. The plural form of *CFL* is written *CFLs*.

Home Activities Survey

The *Home Activities Survey* uses the easily-understood response categories of *Yes* and *No*. However, a response category of *Not Applicable* makes sense for Question 12 (“Did your family change the way they water outdoors” – not applicable to most multifamily residents) and Question 16 (“Did your family turn up the thermostat in summer for cooling” – not applicable to homes without cooling systems).

Many of the questions could reasonably be answered with *Don't Know*; for example, the two questions asking about leaks (Question 6 for toilet leaks and Question 11 for other leaks). Although *Leaks* is a LivingWise® activity, not every student completing the survey will have conducted that activity and the questions do not allow for that possibility.

While it seems likely the students will have been involved in any of the LivingWise® measure installations, such as of the showerhead or faucet aerators, it seems to the evaluators less likely that students will know about household behavioral actions, such as Question 12 (watering outdoors) and Questions 13, 14, 15, and 16 (changing various thermostat settings).



If the program implementer adopts the recommendation to print the *Pre- and Post-Surveys* on separate Scantron® forms, there will be more space available on the page for the *Home Activities Survey*. Were the questions to be reformatted into a single column, response categories could be listed in columns for *Yes*, *No*, *Don't Know*, and *Not Applicable* without creating visual clutter and thus potential confusion. (The categories *Don't Know* and *Not Applicable* could be combined.) Perhaps an alternative to adding response categories would be to provide instructions that say “Leave blank any questions for which you don't know the answer or which don't pertain to your home.”

Question 6 (toilet leaks) appears in the midst of a series of questions about water-flow devices and should be moved out of this series.

Question 19 uses the terms *Compact Fluorescent Lamp* and *CFL*. As discussed for the *Home Check-Up* survey with respect to *incandescent*, the evaluation team has learned that some portion of consumers is unfamiliar with these terms, even if they have such lamps. Again, the terms are used in the LivingWise® materials and therefore are reasonable; nonetheless, the program implementer might consider a change in phrasing to “Did your family install the bulb included in your kit (a Compact Fluorescent Lamp, or CFL)?”

Finally, Question 23 reads “How would you rate the LivingWise® Program?” Although the evaluation team assumes it likely that students understand this question, the term *program* used in this context makes sense to energy efficiency professionals and yet does not necessarily have meaning for program participants. The program implementation team might consider rephrasing the question to simply state: “How would you rate your experience with LivingWise®?”

Home Activity Performance Indicators

The *Home Activity Survey* provides the program implementer with data on measure installation that is used to estimate program kW and kWh savings. In addition, the survey provides data on behavioral actions that are not included in the energy savings calculations. As noted for the *Pre- and Post-Surveys*, separate performance indicators can be constructed from each behavioral question in the *Home Activity Survey*, yet a better approach may be to develop three indicators, similar to those described for the *Pre- and Post-Surveys*. One, an indicator for reporting the penetration of the most frequently reported behavior (plus a note as to what that behavior is); two, an indicator reporting the number of behaviors endorsed by X% or more of the students; and three, an indicator reporting the proportion of students endorsing Y or more behaviors (with the thresholds “X” and “Y” to be determined in advance by data analysis.)

Teacher Program Evaluation Survey

The *Program Evaluation* survey that teachers are asked to complete has the virtue of simplicity: seven categorical response questions; two open-ended response questions; and two status questions asking the number of students and the number of Scantron® forms returned.



The evaluation team recommends adding a single categorical response item: “The materials enable me to meet California Department of Education requirements.”

Parent Response Card

The *LivingWise*® *Activity Kit* includes a post card that solicits parents’ responses. Like the teacher survey, the parent survey has the virtue of simplicity: three *Yes/No* questions and one open-ended response question.

The evaluation team suggests the card be re-worked to eliminate the use of the word *program*, as the team believes consumers as a group are not fully familiar with the word as used by energy efficiency professionals. It is likely that a simple change will improve parental comprehension: substitute *LivingWise*® for the phrases *our program*, *the LivingWise*® *Program*, *the program*, *this program*, and *program* as used in the phrase *program sponsor*.





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13 LIVINGWISE[®] CONCLUSIONS AND RECOMMENDATIONS

The assessment of the LivingWise[®] Program addresses the following evaluation objectives:

1. Assess the alignment of current LivingWise[®] educational resources with California State educational standards, as this is critical for teacher acceptance of the program.
2. Explore teachers' assessments of the LivingWise[®] curriculum and Action Kits in terms of ease of use, quality of content, and ability to engage and motivate students.
 - a. Explore whether teachers' curriculum assessments vary by socioeconomic characteristics of the school communities.
 - b. Explore with teachers whether student response to the LivingWise[®] messages of *environmental conservation* and *cost savings* vary by socioeconomic characteristics of the schools' communities.
 - c. Explore with teachers their students' responses to the Action Kits and the extent to which the kits are effective in engaging families in energy conservation. Explore whether barriers to installation of items in the Action Kit vary by socioeconomic characteristics of the school communities.
3. Identify opportunities for program improvement.

The evaluation team summarizes the findings and draws conclusions relating to each objective, starting with findings relating to the program as a whole. The team's recommendations often address conclusions relating to multiple objectives and so are grouped together in the last section of this chapter.

In addition to the recommendations in this chapter, the prior chapters explicitly note opportunities to enhance the program and its administration.

OVERALL ASSESSMENT OF THE LIVINGWISE[®] PROGRAM

Summary of Findings

The interviewed teachers are grateful the LivingWise[®] Program offers them a hands-on teaching resource and provides their students' households with conservation tools to which they might otherwise lack access. The teachers want to see the program continue and would like to teach the program to their students each year.

The evaluation team reviewed the LivingWise[®] instructional materials and found them to be of high quality with respect to many important criteria, such as coherent curriculum, aesthetic



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appeal, engaging interactive materials and exercises, effective delivery of conservation measures, suitability to a range of student abilities, clear presentation for students, ease of use by teachers, and effective processes geared toward program completion by teachers and program reporting by implementers.

The evaluation team also identified significant opportunities for improvement in the LivingWise® Program, primarily in the instructional materials, which are detailed in the remainder of this chapter.

Conclusions

The LivingWise® Program and materials have much to commend them. LivingWise® provides teachers and schools with a resource and conservation curriculum they would otherwise lack. It empowers students and their families to take actions to conserve resources and increases Edison’s visibility as a leader in energy conservation among communities with school-age children.

The program implementer could improve the program by increasing the curriculum’s alignment with California Department of Education content and instructional standards, and use of research-based best instructional practices, as well as by revising the *Pre- and Post-Surveys* to measure student knowledge with respect to key LivingWise® concepts and to the educational standards with which the curriculum correlates.

ALIGNMENT OF LIVINGWISE® RESOURCES WITH CALIFORNIA EDUCATIONAL STANDARDS

Summary of Findings

The California Department of Education specifies both content standards and instructional standards. The LivingWise® materials cover the science and math content that the program implementers have identified as correlated to the curriculum. In fact, the evaluation team believes that with minor modifications, the materials can cover additional content standards, as indicated in Chapter 10.

However, the evaluation team was intentional in its use of the word *cover* with respect to the LivingWise® treatment of the content areas. As currently structured (a streamlined curriculum with optional features and home activities, and workbook tasks at the end), the LivingWise® materials “teach” its science and math content at only the lowest level of cognitive development – *the recall of facts and information*. The basic approach to the curriculum does not include higher levels of cognitive development, such as *demonstrating understanding, analysis, synthesis, or evaluation*.



Thus, the LivingWise® curriculum, while *covering* the science and math content standards, falls short of *teaching* the content standards, according to both instructional standards set by the California Department of Education and research-based best practices.

A very positive finding is that the evaluation team believes the LivingWise® materials already contain most of the building blocks necessary to meet established standards and best practices for instruction.

Conclusions

The LivingWise® Program would come much closer to meeting educational standards and best practices were it to:

- ➔ Integrate many of its optional activities into the base curriculum
- ➔ Integrate the Activity Kit and Workbook activities into each lesson (instead of concentrating them in lesson six)
- ➔ Make relatively minor changes to the lessons to better align with a few content standards
- ➔ Include in the Teacher Guide instructional strategies that engage the students in discussing essential questions and thinking about overarching ideas for which there may be multiple answers
- ➔ Include in the Teacher Guide directions for assessing learning with respect to the state's science and math content standards

EXPLORE TEACHERS' ASSESSMENTS OF THE LIVINGWISE® MATERIALS

Summary of Findings

Interviewed teachers described the program as easy to use. It addresses students with a range of aptitudes, yet is weakest with respect to the more advanced students. The six interviewed teachers perceived the LivingWise® curriculum as meeting California content standards.

Teachers appreciate that the LivingWise® materials are professionally produced. The materials are attractive and generally engaging for students – especially the Activity Kit and, to a lesser degree, the Student Guide. Teachers believe the program's incorporation of conservation measures encourages students to realize they can take actions that will help “save the earth.”

Teachers unanimously reported that the contents of the *LivingWise® Activity Kits* are the central motivator for student participation and that students enjoy installing energy-saving devices in their homes. Teachers expressed a desire for additional supplemental materials to further engage students. Teachers also would appreciate translation of more LivingWise® materials intended for home use into more languages.



Finally, the current study suggests the appeal of the LivingWise® Program overall does not vary by the socioeconomic characteristics of the school communities. The theme of cost savings appears to have less appeal among upper-income students, whereas the theme of environmental stewardship appears to appeal strongly to students in all three socioeconomic groups explored in the study. Yet the small sample of six teachers and the impressionistic data do not support a firm conclusion on this topic. The program implementer has not analyzed measure installation data by socioeconomic characteristics of the school. For the 2007-2008 year, the program materials emphasize cost-savings and, according to the program implementer, more parents returned comment cards than in previous years.

Teachers reported the Activity Kits are successful in engaging households in energy conservation. They noted a few barriers to measure installation, which may vary with the socioeconomic characteristics of the household. These barriers were noted by teachers as applying to some of their students: the faucet aerators don't fit some "designer" faucet-heads; the showerheads were rejected based on their amount of flow or appearance; and the toilet-leak detector tablets were not used, as parents assumed they would stain the toilet bowl or would interfere with the chemical cleaner that is used in the toilet. Teachers thought most students whose parents rent their residence were not precluded from installing the measures.

Teachers also reported some students have difficulty conducting the Workbook calculations and one of the six interviewed teachers said his class did not complete the calculations.

Conclusions

The LivingWise® materials appeal to teachers as easy to use and generally engaging to students, yet teachers noted the materials could be enhanced by: making the curriculum more challenging, especially for higher-performing students; incorporating more learning strategies and resources in addition to reading; and simplifying the calculation instructions in the Workbook.

POSSIBLE KEY PERFORMANCE INDICATORS

Summary of Findings

To date, the LivingWise® Program has not been assessed on key performance indicators. The research team's preferred approach to selecting key performance indicators would be to select the most important performance indicators identified from the logic model that are most critical to performance outcomes.

The program logic model for the 2006-2008 program cycle, developed by Research Into Action under contract to Edison, did not include performance indicators due to time constraints (the logic model was needed to inform the program's impact evaluation.) While the development of a full logic model is outside the scope of this research, in order to address the need to identify key performance indicators, the evaluation team worked with Edison under a separate contract to develop a logic model for the 2009-2011 program cycle, including a program theory narrative



and performance indicators with associated sources of data. The deliverable from this effort will enable the EARTH Schools program manager and the implementation contractor to select key performance indicators. The implementer can then include these indicators in its status reports to support proactive continuous process improvement through regular monitoring of program performance over appropriate intervals of time.

Conclusions

It is reasonable for Edison to establish key performance indicators for LivingWise® and efforts by the evaluation team subsequent to the current study will assist Edison in this process.

All parties agree the status reporting processes do not provide either Edison or the program implementer with the data and interpretation necessary to judge such factors as student learning or teacher compliance rates, and to support continuous program improvement.

OPPORTUNITIES FOR PROGRAM IMPROVEMENT

Summary of Findings

The findings from teacher interviews complement the findings from the curriculum review in pointing to opportunities to improve the LivingWise® Program.

Conclusions

Increasing the ability of the LivingWise® materials to foster substantive student learning will improve the program, both in terms of its educational effectiveness and in teacher satisfaction.

Changes that increase student engagement necessarily increase teacher involvement with the material. Yet the consequent demands placed on the teachers are no greater than the demands placed on them by established California content and instructional standards. Further, the more the LivingWise® Program provides a complete curriculum that meets content and instructional standards, the less burden on teachers to either augment the program with their own resources or deliver the curriculum as is and meet content and instructional standards in the time not devoted to LivingWise®. Finally, were the curriculum to be enhanced, no participating teacher would be worse off; teachers that want to take the “easy route” are always at liberty to do so.

RECOMMENDATIONS

Improving LivingWise® Educational Resources

LivingWise® educational resources would be improved were the program implementer to address the following recommendations.



1. **Add teacher directions that clearly integrate the Activity Kit with the science content instruction and position the Workbook activities and calculations as a daily homework application.**
2. **Offer more fully developed lesson plans that include instructional strategies and incorporation of content now positioned as optional.** The program already includes a number of interactive and engaging options that can move teachers beyond coverage and cursory reading to effective student engagement and understanding. As examples:
 - a. Some of the *Making Connections* questions in the Teacher Guide could be used for student writing opportunities or as opening questions to access students' prior knowledge before introducing each lesson.
 - b. Information and activities from The National Energy Foundation posters could be integrated into the Teacher Guide.
 - c. Some of the *Classroom Activities* could be positioned as part of the core curriculum.
 - d. Students need opportunities to engage in discussing essential questions and thinking about overarching ideas for which there may be multiple answers. Reflection and the opportunity to process new learning through research and writing are also important. These elements can be incorporated into both the Student and Teacher Guides.
3. **Simplify, as indicted, the Workbook calculations and direct teachers in an approach to discussing the calculations during class time.** Currently, teachers and the program implementer have no way of assessing student accuracy in data collection and success in installing the energy- and water-saving devices. Further, without classroom instructional time devoted to the calculations, the mathematics in the Workbook fall short of attaining Department of Education standards for "teaching."
4. **Consider re-positioning the *Resource Action Get Wise about Energy and Water Efficiency Blog* (<http://resourceactionblogspot.com>) more prominently on the *Getwise.org* site** so students, parents, and teachers can access the resources provided and develop the interactive flow of information anticipated with a blog.
5. **Consider updating or removing the *GetLivingwise.org* site and merging any useful information to an appropriate spot on either the *GetWise* or *RAP* sites.**
6. **Demonstrate understanding of the rich diversity of languages in California communities and consider providing on-line Activity Kit information, savings estimates, and installation directions in multiple languages.**



7. **Consider ways to visibly increase sensitivity to the diverse ethnic heritage of the students and teachers of California by including photos representative of the overall ethnic demographics.**
8. **Most significantly, provide links to quality curricula resources that support and reinforce the LivingWise® lessons.** Specifically, curricula that support the following aspect of the stated RAP.org site Mission:

“... Our personalized education approach is truly unique. By using hands-on learning, **accommodation to different learning styles**, adaptive lesson plans, and flexible time schedules, there is something to be gained by everyone involved. Our main priorities are teaching the value of clean water and energy, where our resources come from, the impact of everyday actions and the power of individual and collective action.”

Improving the LivingWise® Pre- and Post-Surveys

The evaluation team offers the following twelve questions as possibilities for an improved Pre- and Post-Survey. All of the questions address information included in the student guide; page numbers cross-referencing the guide appear in the parenthetical comment following the question. Of the 12 questions, seven (questions 1, 2, 4, 6, 8, 9, and 11) address science content standards and five (questions 3, 5, 7, 10, and 12) address concepts relating to the program’s goal of changing students’ awareness of energy efficiency actions and benefits. Cross-references to the applicable science content standards appear in the parenthetical comment following the question. Note that two of the questions – on the topic of water – address grade five science content. Water is covered in the grade five curriculum, while energy is covered in the grade six curriculum. These two questions are appropriate for the test because LivingWise® covers water usage and the program is co-sponsored in Edison’s territory by water agencies.

(✓ Signifies correct answers)

1. Classify each of the natural resources below as either renewable (R) or non-renewable (NR).

[CA grade six science standard 6.b; Student Guide p. 2]

R	NR	NATURAL RESOURCE
✓		Wind
	✓	Natural Gas
	✓	Oil
✓		Sun light
✓		Water
	✓	Coal



2. Why is it important to conserve fresh water?
[CA grade five science standard 3.d; Student Guide pp. 3-9]
- Fresh water makes up less than 1% of all the water on earth
 - Humans currently use over half of the world's available fresh water
 - Fresh water comes from oceans, and using too much of it can harm sea life
 - a and b ✓
 - None of the above, since fresh water is a renewable resource, it does not need to be conserved
3. If you become more energy efficient you can...
[Student Guide pp. 18-19]
- Save electricity and other resources
 - Save money on utility bills
 - Reduce air pollution
 - All of the above ✓
4. Which of the following is NOT true about ground water?
[CA grade five science standard 3d; Student Guide pp. 3-9]
- It is found below the earth's surface
 - Scientists call the water in lakes and rivers "ground water" ✓
 - It is an important natural resource because, unlike most of the water on earth, it is safe for humans to drink
 - If we do not conserve and recycle water, our supplies of ground water could run out.
 - It is likely to be less affected by pollution than other water sources
5. Which of these fossil fuels, when burned to produce energy, creates the least amount of smog, acid rain, and greenhouse gas emissions?
[Student Guide pp. 10-12]
- Coal
 - Natural gas ✓
 - Petroleum oil
 - Gasoline
6. Which of the following is NOT a way that we use energy from the sun?
[CA grade six science standards 4.a, 5.a; Student Guide pp. 13-16]



- a. Generating electricity through nuclear power since the sun puts energy into atoms that are split through a complex process called nuclear fission ✓
 - b. Eating green vegetables that have absorbed the sun's energy through photosynthesis
 - c. Using windmills to generate electricity, because energy from the sun creates wind on earth
 - d. Generating hydroelectric power through dams that take advantage of the water cycle, which is powered by the sun
 - e. None of the above. These are all ways that we use energy from the sun.
7. Which of the following is the most accurate list of the energy sources that generate our electricity in Southern California?
[Student Guide p. 16]
- a. Solar, wind, and oil
 - b. Electricity, natural gas, water
 - c. Natural gas, nuclear, hydroelectric, coal, renewable ✓
 - d. Renewable, natural gas, coal, electricity, chemicals, gasoline
8. How can you prevent heat loss *by conduction* through the shell of your house?
[CA grade six science standard 3.c; Student Guide pp. 30-32]
- a. Insulate your walls and ceiling ✓
 - b. Close the doors and windows on a cold day
 - c. Change your furnace filter regularly
 - d. Plant trees for shade
9. To keep your house cool in the summer, what type of energy transfer from the outside to the inside can you prevent by closing the shades, curtains or blinds on your windows?
[CA grade six science standard 3.a and 4.b; Student Guide pp. 19, 29-31]
- a. Conduction
 - b. Convection
 - c. Radiation ✓
 - d. Charging
10. The Compact Fluorescent Lamp (CFL) is more energy efficient than the traditional incandescent light bulb because...
[Student Guide pp. 32-33]



- a. CFL light is produced by gas and uses 75% less energy
 - b. 90% of the energy used to produce incandescent light is lost as heat
 - c. The CFL lasts seven to ten times longer than the incandescent light bulb
 - d. All of the above ✓
11. When a fuel is consumed, most of the energy released becomes...
[CA grade six science standard 3.b; Student Guide p. 33]
- a. Heat energy ✓
 - b. Light energy
 - c. Potential energy
 - d. Depleted energy
12. Which of the following actions will save energy?
[Student Guide p. 19]

CHECK THIS BOX IF ACTION SAVES ENERGY	ACTION
✓	Turn off lights when you leave the room
✓	Buy Energy Star® appliances
	Watch movies at home instead of going to a movie theater
✓	Take short showers
✓	When you are cold or hot indoors, change your clothing; don't change the thermostat

The *Pre-* and *Post-Surveys* should be published on separate Scantron® forms, rather than on the front and back of a single sheet, as is the current practice. The question order should be varied from the *Pre-* to the *Post-Survey*, as well as the ordering of the responses, to reduce the possibility of students simply repeating answers from the *Pre-Survey* onto the *Post-Survey*.

Improving LivingWise® Status Reporting

The EARTH Schools program manager and the program implementer should collaborate to redesign the program reporting formats. The revised reports should include, among other things, explicit reporting on the comparison between students' *Pre- and Post-Survey* answers, the proportion of students submitting survey data, and the proportion of teachers submitting program data. Chapter 12 provides possible program performance indicators for Edison's consideration. Once the reporting structure has been finalized, the program implementer can design its data-tracking and analysis system to be able to generate the necessary information.



Recommendations for Future Research

The LivingWise® Program might benefit from the following research:

- ➔ An analysis of measure installation rates by school socioeconomic characteristics.
- ➔ An investigation of the teaching methods of teachers whose students evidence high measure installation rates to identify best practices and incorporate these teaching strategies into the curriculum.



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SECTION 3: GREEN CAMPUS PROGRAM

CHAPTER 14: GREEN CAMPUS PROGRAM AND PROJECT BACKGROUND

CHAPTER 15: GREEN CAMPUS ASSESSMENT FROM INTERVIEW FINDINGS

CHAPTER 16: GREEN CAMPUS ASSESSMENT FROM SURVEY FINDINGS

CHAPTER 17: GREEN CAMPUS REPORTING AND PERFORMANCE INDICATORS

CHAPTER 18: GREEN CAMPUS CONCLUSIONS AND RECOMMENDATIONS



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SECTION 3: GREEN CAMPUS PROGRAM



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14 GREEN CAMPUS PROGRAM AND PROJECT BACKGROUND

PROGRAM DESCRIPTION

The Green Campus Program is an educational and direct-action program developed and implemented by the Alliance to Save Energy. During the 2006-2007 and 2007-2008 academic years, Green Campus had an active presence at the University of California campuses of Irvine and Santa Barbara; California State University, San Bernardino; and California State Polytechnic University, Pomona. In addition to these four campuses in the Edison territory, Green Campus was active at nine other campuses in the territories of other California investor-owned utilities.

The Green Campus Program deploys student interns who can organize and prepare energy conservation activities that make it fun and easy for other students to participate in those activities, as well as support campus staff interested in taking energy efficiency steps. College student interns who participate in the program play a central leadership role in planning and carrying out the activities of the Green Campus Program under the guidance of program implementation staff and in consultation with campus faculty, administrators, and facility staff in a shared partnership effort.

The program implementer hires and trains between two and six student interns per campus, for a total of 40 hours a week of paid intern time per campus. The number of interns hired on a given campus varies from school to school and depends on the amount of time each intern is able to commit to the program. The program implementer provides each campus intern team with an operating budget for use in securing space for events, providing incentives for student conservation, and purchasing project materials.

The program implementer supports the interns through training, regular on-campus visits and telephone consultation, bi-annual convergences of Green Campus teams throughout the state, and career consultation. Training includes an introduction to the components of the Green Campus Program and energy use on campus, as well as in-depth training on topics such as meeting facilitation, marketing, budgeting, reporting, and other program-related knowledge and skills. Periodic training sessions on best practices, professional skills, careers in the energy field, and emerging technologies also occur through the program.

The program implementer recruits program stakeholders at each campus to work with the intern team. Recruited stakeholders vary across the campuses, yet collectively include professors, facility staff, dining and residence directors, campus administrators, and university system administrators. The program implementer recruits as stakeholders faculty and staff who are interested in Green Campus goals, are willing to provide direction to interns, and willing to collaborate with interns on projects to save energy.



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Green Campus student interns begin each academic term by consulting with program implementation staff and campus stakeholders to develop a strategic plan detailing projects and initiatives consistent with the program's goals. The interns work independently – under supervision by the program implementer – to carry out energy-saving initiatives at their universities. This independence allows interns the flexibility to focus on initiatives that meet the specific needs and character of their campus. The program also provides opportunities for interns to share their experiences with their peers at other universities, allowing successful initiatives – and lessons learned from less-successful initiatives – to spread to multiple Green Campus universities.

Interns lead activities geared towards achieving immediate cost- and energy-saving impacts on campus by encouraging students, faculty, and staff to adopt new behaviors as energy consumers. Consistent with its designation as an Edison resource acquisition program, in 2006-2008 Green Campus had as its primary focus the attainment of energy savings through intern-facilitated activities.

Interns are also involved in educating the campus community on the *why* and the *how* of energy savings. This education may be accomplished through general awareness and outreach campaigns, or through the development and conduct of symposia and other extracurricular courses that educate students about energy conservation and sustainable environmental practices.

Green Campus interns and volunteers work in partnership with faculty, administration, and staff to identify energy-saving opportunities on campus, and to promote energy efficiency and conservation throughout the school year. They conduct energy audits and other research, document the results, and, as appropriate, based on their findings, make policy recommendations to administrators related to campus energy efficiency and conservation. Student research can reduce the information-gathering costs that necessarily underpin a switch from conventional to more sustainable practices.

Through all these activities, students – both interns and students from the student body at large – learn that energy efficiency can provide a career focus, and they begin gaining knowledge and skills relevant to such a focus. The Green Campus Program also offers a variety of career development and networking opportunities to its interns, designed to help them launch careers focused on energy efficiency.

PROGRAM THEORY AND LOGIC MODEL

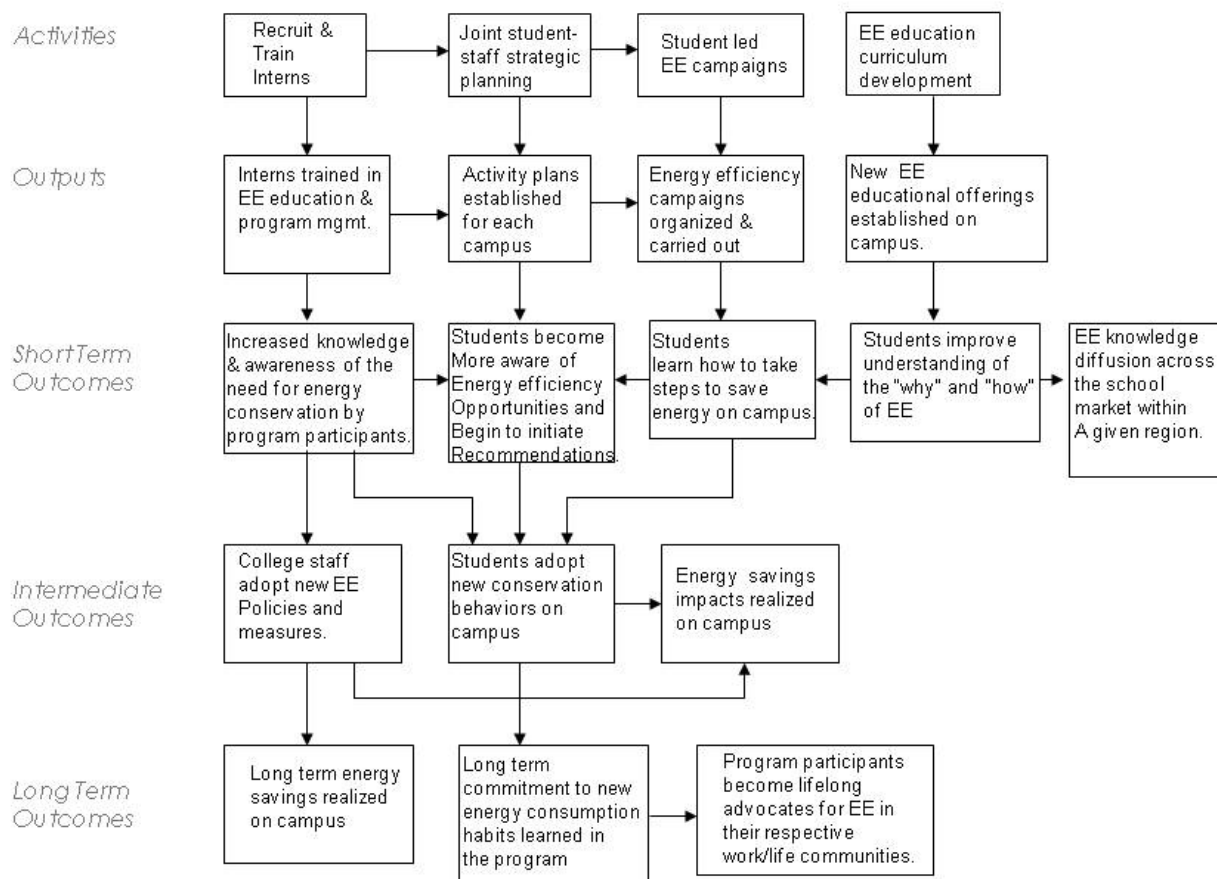
Edison evaluation staff developed a logic model and program theory for Green Campus in December 2007, prior to the launch of the CPUC impact evaluation for the program. The logic model is shown in Figure 14.1. The program theory document is given in Appendix E. Due to time constraints at the time of logic model development, program performance indicators for the logic model links were not specified. Evaluation staff developed both the logic model and program theory in consultation with the EARTH Schools program manager and the program



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implementer, who approved both the model and theory as accurate representations of the program at the time they were developed.

Figure 14.3: Green Campus 2006-2008 Program Logic Model



UPCOMING PROGRAM CHANGES

Edison is making the following changes to the Green Campus Program for the 2009-2011 program cycle.

For the 2009-11 cycle, the program serves the goals of the Statewide Workforce Education and Training Program (see Chapter 1, *Introduction*). Consequently, Green Campus implementation will increase its focus on career development and preparing interns and other program participants for careers in energy efficiency and renewable energy. No longer a resource program, Green Campus will not be able to use Edison funding for CFLs and so will no longer have CFL exchanges, one of the primary activities to date to which energy savings estimates have been ascribed.



Also mentioned in Chapter 1, the contracts for the 2009-2011 EARTH Schools Program will include performance requirements. Edison will finalize the performance metrics after it receives CPUC approval of its Program Implementation Plan.

The upcoming contract for Green Campus will also include a clause that the program interns will inform participating universities of Edison's nonresidential audit and incentive programs.

PRIOR PROGRAM EVALUATIONS

First offered by Edison in 2004, one prior evaluation has been conducted for the program:

- ➔ *Alliance to Save Energy's Green Campus Program: Year 1 & 2 Evaluation Report*, prepared for the California Public Utilities Commission by Skumatz Economic Research Associates, October 31, 2006.

Key recommendations from this evaluation centered on the following themes:⁵⁹

- ➔ Improve interns' abilities to measure and track success indicators, both in terms of direct energy savings and in terms of behavior change. The program should develop metrics to measure awareness of energy issues and behavior change; interns should conduct relatively large-scale surveys (n=200) at the beginning and end of the academic year to measure behaviors and attitudes related to energy use. The program implementer should also invest in additional meters to measure energy savings resulting from intern-led programs.
- ➔ The program implementer should develop systems to compare progress indicators across campuses in order to track the progress of the program as a whole and identify best practices that contribute to the success of intern-led projects.
- ➔ The program implementer should focus on building networks of stakeholders to support Green Campus intern activities. Green Campus interns can achieve significant benefits from working closely with campus energy managers and facility managers.
- ➔ The program implementer was encouraged to develop a plan to find long-term, sustainable funding for the Green Campus Program and to ensure that the program maintained its level of quality as it expanded. The evaluation highlighted the level of service that campus leads provide to interns as an important factor in maintaining program quality.

⁵⁹ The current evaluation team distilled these themes from the seven pages of recommendations presented in the report's Executive Summary.



EVALUATION OBJECTIVES AND METHODOLOGY

Objectives

This assessment addresses the following evaluation objectives, as developed by Edison:

1. Identifying success factors and other factors influencing the performance of Green Campus schools, including current approaches to identifying and disseminating best practices across schools.
2. Explore the opportunity to add performance measures to the Green Campus Program.

Edison formulated the evaluation objectives to aid its continuous improvement efforts. Thus, this process evaluation falls in the category of formative evaluations. The evaluation is not intended to be summative, that is, an assessment of program outcomes and the degree to which the program attained its objectives.

Impact evaluations are no longer in Edison's purview. The California Public Utility Commission conducted an impact evaluation of Green Campus concurrent with this process evaluation. The study was still underway at the time this report was finalized, with an anticipated publication date of late fall 2009. The current process evaluation did not validate the electricity and dollar savings claimed for Green Campus by the program implementer.

Methodology

To address the research objectives, the evaluation team conducted in-depth interviews by phone with program staff of Edison (the EARTH Schools manager and his supervisor) and the implementation contractor team, including two managers and two leaders of intern teams. These interviews occurred between May and August 2008.

The evaluation team also conducted an online survey in June 2008 of Green Campus interns from the four universities within Edison's territory that participate in the program. Twelve out of the 17 interns responded: four interns from California Polytechnic University, Pomona; two from California State University, San Bernardino; three from the University of California, Santa Barbara; and three from the University of California, Irvine. The evaluation team sent \$25 gift cards to the responding interns.

In addition to these efforts, the process evaluation team wrote about a half-dozen questions to include in the impact evaluation surveys being conducted for the program by The Cadmus Group, Inc.⁶⁰ The impact evaluation team fielded surveys of Green Campus student interns and

⁶⁰ The Cadmus Group was working as a subcontractor to KEMA, Inc., who holds the prime contract with the CPUC to conduct direct and indirect impact evaluations for 2006-2208 programs the CPUC classifies as Specialized Commercial. Their findings were not finalized at the time this process evaluation was finalized.



facility managers at universities that participate in the Green Campus Program. The impact evaluation team fielded these surveys in the second quarter of 2008. A total of ten interns from the four Green Campus universities that are within Edison's territory and four facility managers, representing three of the universities, responded to the impact surveys.

As stated, this investigation was not intended to be a comprehensive evaluation of the statewide Green Campus Program. The evaluation objectives focused on a narrow set of issues; its purview is the four participating universities within Edison's service territory, and data collection was limited to interns and program staff. The evaluation focuses on the experiences of and interactions between Green Campus interns, the program implementer, and Edison staff, in order to shed light on success factors and identify potential performance indicators.

Appendix J contains the survey instruments.

GREEN CAMPUS SECTION ORGANIZATION

The report section on the Green Campus Program comprises Chapters 14 through 18. In addition to this chapter, which provides a brief program description and the evaluation approach, Chapter 15 presents findings from interviews with Edison and program implementer staff. Chapter 16 summarizes the results of the intern survey and the relevant findings from the impact evaluation surveys. Chapter 17 addresses program reporting and performance indicators. Chapter 18 provides conclusions and recommendations for the Green Campus Program.



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This chapter presents findings from interviews with Edison and program implementer, organized into the following sections:

→ **Program Structure**

- Program Administration
- Intern Selection
- Intern Training and Orientation
- Intern Roles
- Workforce Development
- Evaluation of Interns

→ **Green Campus Intern Activities**

- Organization and Project Planning
- Intern-Led Energy Efficiency Projects
- Intern Efforts to Develop Energy Efficiency Curriculum

→ **Stakeholder Advisory Committees**

- Formation of Stakeholder Advisory Committees
- Committee Meetings

→ **Convergences**

→ **Green Campus Links to Other Edison Programs**

→ **Monitoring, Reporting, and Continuous Improvement**

- Measurement Training Interns Receive
- Metrics Reported on Each Campus
- Program-Wide Success Metrics



PROGRAM STRUCTURE

Program Administration

Campus leads, who are professional staff members of the program implementation contractor, are the primary liaisons with the Green Campus student interns, providing interns with training, support, and supervision. Five campus leads support the 13 Green Campus universities in the state, with each campus lead supporting between two and three universities. Two campus leads support the universities in Edison's territory.

The five campus leads, in turn, comprise the direct implementation team, to ensure uniformity across the program statewide and the diffusion of effective projects and implementation methods. The supervisor of the direct implementation team also works as a campus lead, overseeing interns at two universities. The direct implementation team meets bi-weekly to compare experiences and activities specific to the Green Campus Program, share best practices, strategize, and plan statewide convergences.

In addition to these management structures, the implementation contractor has an education team, which meets weekly to resolve issues that any of the organization's education programs face. The education team members includes the supervisor of the direct implementation team, the Director of California Education Programs (which includes the Green Campus and Green Schools programs), and the organization's Vice President for Education, as well as other supporting staff.

→ **Implication: Based on the interviews, it appears the program has structures in place to facilitate a rapid response to campus developments.**

According to contacts, the campus leads communicate with the intern teams they supervise through weekly phone calls – either with the intern team leader or the intern team as a whole – and visit the interns' campuses approximately every six weeks. During these visits, the campus leads meet with interns and stakeholders. In addition to these duties, the direct implementation team, under the supervision of the implementer's program manager, plans and facilitates the two convergences that occur each year, bringing together interns and stakeholders from all of the California universities where the Green Campus Program operates.

The campus leads work with campus staff to find office space for interns; however, not all of the participating universities have been able to provide dedicated space to the Green Campus Program.

Intern Selection

Contacts stated that, to achieve the program's objective, each campus participating in the Green Campus Program needs at least two interns. Campuses may have as many as six interns, with an intern team manager contributing the most hours. When there are fewer interns on a campus, each intern has more paid hours and greater responsibilities. Smaller intern teams typically take



on fewer projects than larger teams, although the implementer funds all teams at 40 hours a week. The specific projects that occur on a given campus depend in large part on stakeholder buy-in.

According to contacts, the Green Campus Program uses the resources available on each campus to recruit interns. This includes placing ads in the campus newspaper, working through the campus career center, identifying students by the recommendation of such stakeholders as professors or the campus energy manager, or approaching students through their academic advisors. If a university does not have an existing Green Campus Program, the program implementer first works to establish a network of stakeholders among the faculty and staff to support the interns. The program implementer then works with these stakeholders to hire the first team of interns.

In reviewing candidates, the program implementer indicated that it seeks students with enthusiasm for energy efficiency and experience working in the field. However, the implementer also stated that it values diverse experience among interns, including skills in technology, business, engineering, and communications. Organizing skills, self-motivation, and a desire to learn are additional traits that the program implementer seeks in an intern. Finally, the program implementer seeks interns who are mature, yet who are not graduating in the near future, in order that (ideally) they may intern for the program for several years. Implementation staff members conduct phone interviews with intern candidates, followed by daylong site interviews that include members of the existing intern team.

According to contacts, more than half of the campuses participating in Green Campus have volunteer clubs associated with the program. Contacts elaborated that campuses where a large proportion of the student population commutes, rather than resides on campus, are less likely to have such clubs. In some cases, students may be involved in these clubs as program interns, receiving only academic credit and not pay.

These clubs may constitute a pool of potential candidates to fill Green Campus' paid intern positions as they become available. Interns may graduate mid-year, and the program implementer credits the volunteer base that these clubs provide with facilitating the program's rolling hiring process and significantly easing the transition from one intern to the next.

➔ **Implication: Intern participation in volunteer clubs can extend the influence of Green Campus. Clubs associated with the program can mitigate the negative effects of intern turnover by providing a pool of qualified candidates to fill intern positions.**

Intern Training and Orientation

New interns receive an orientation to the Green Campus Program that includes information on the goals of the program and training around energy conservation. In addition, interns receive logistical training, including details on how to use the program's website, how to work with the program implementer, and how to file their timesheets. Each intern is also provided with a copy



of the *Green Campus Intern Handbook*, which covers program goals and requirements, logistical information, and measurement and reporting procedures. Interns must acknowledge that they have read the Handbook when they sign their offer letters accepting the position.

While the program implementer expects interns to have prior knowledge of energy issues, energy audits require a level of technical knowledge beyond those expectations. Consequently, all new interns also receive training in conducting energy audits. Interns receive this basic audit training during statewide convergences, from campus leads or stakeholders, or through auditing trainings organized by utilities. The program implementer developed the training materials for the interns, rather than relying on professional educators.

Contacts report that the strength and experience of the Green Campus intern team at a given university determines the role the program implementer plays in providing orientation to new interns at that university. When there is an experienced team in place, the implementer allows experienced interns to train new hires. This base of knowledge helps to maintain continuity within Green Campus groups despite a high rate of turnover among interns because of graduation and transfers. However, when all or most of the interns at a university are new, the program implementer provides a much more comprehensive orientation.

The program implementer expects that interns will continue to learn throughout their work with the intern team at their university. Teams largely made up of new interns may start with smaller projects – like distributing literature at an exhibition table at events – and build to more complex initiatives that may include presenting information to larger audiences or engaging in direct campaigns to save energy.

Interns also learn from intern teams at other universities. In addition to the sharing that takes place at the bi-annual convergences, the campus leads, in a weekly conference call, compare the experiences of each of the universities they oversee and pass their conclusions from these meetings on to the interns they supervise. Campus leads use the document-sharing website and the intern list serve to distribute information to the interns.

→ **Implication: The implementation contractor has established multiple channels for the ongoing training and education of interns.**

However, findings from the program evaluators' survey of Green Campus interns, coupled with a brief review of the program's website, suggest that the document-sharing website and the opportunities for interns to learn from their peers on other campuses may not be meeting their full potential, as discussed further in Chapter 16.

Measurement Training Interns Receive

The training Green Campus interns receive emphasizes the importance of developing systems to monitor and report on the success of their efforts, and the program implementer hopes to increase this emphasis in the coming year. The program implementer provides interns with



templates showing how to calculate energy savings. In addition, the *Green Campus Intern Handbook* lists examples of metrics that interns can use to measure progress toward each of the program's overall goals.

For example, the Handbook instructs interns to evaluate efforts to raise awareness of energy efficiency through measures of active participation in Green Campus events (defined as in-person interaction with Green Campus interns or programs using Green Campus materials) and measurements for inactive participation (defined as exposure to Green Campus materials through media). The Handbook recommends measuring the relationships between intern teams and campus stakeholders through the frequency and attendance of meetings with stakeholders, the amount of funding or in-kind support that stakeholders contribute to the Green Campus Program (p. 24), and any changes the Green Campus Program initiates in campus policy.

According to the program implementer, some interns receive measurement training that goes beyond the information that the Interns Handbook and the templates provide, to include the importance of success measures not limited to the quantity of energy saved. These metrics may range from collecting data on a building's past energy use to conducting a survey of the residents in a particular residence hall.

Additionally, the Green Campus Program maintains a large document-sharing website to give interns access to the success measures used for similar projects at different universities. Interns may also learn from the experience of other members of their university's intern team. In addition, campus leads contribute their knowledge of what success measures have been effective on a national level.

The type of metrics included in the newsletters interns produce include the number of incandescent bulbs exchanged for CFLs; energy savings that result from those exchanges are calculated based on assumptions of the bulbs' run time. However, since Green Campus will be a non-resource program for the 2009-2011 program cycle, CFLs will no longer be exchanged.

The newsletters also include more complex metrics, like the savings that result from energy competitions. To report these metrics, the member of the intern team with the greatest technical understanding receives training in interpreting baseline data and calculating energy savings. This training goes beyond the metrics training that all interns receive at the twice-yearly convergences that the Green Campus Program holds. The program implementer supplies this type of additional training when intern teams take on projects that require complex measurements or additional project-specific training.

- ➔ **Implication: Findings suggest the program implementer has provided interns with training, information, and tools that they can access to measure and track success indicators, as recommended in the prior evaluation.**
- ➔ **Implication: Because the Green Campus Program will be a non-resource program starting from the 2009-2011 program cycle, an opportunity exists for interns to further develop and report success metrics focused on traditional "education and**



information program” evaluation criteria: measuring changes in attitudes, knowledge, and behavior relating to energy efficiency and conservation.

Intern Roles

The program implementer has identified four roles for interns to carry out within a Green Campus intern team: team manager, treasurer, secretary, and media relations. While the program implementer has defined these four roles, it recognizes that interns on teams comprising fewer than four will have multiple roles and that all teams may define for themselves additional roles.

The team manager serves as the on-site manager of the Green Campus Program at each university. According to the *Green Campus Intern Handbook*, the team manager is responsible for reporting on dynamics within the intern team and notifying the program implementer if a team member’s performance is not meeting expectations. Team managers are also responsible for making sure that the intern team completes its deliverables as required by the program, and for making the team’s travel arrangements. Because of the importance of these responsibilities, the program implementer assigns a team manager for each campus. In selecting an intern to fill the role, the program implementer seeks an individual with strong leadership skills and a positive dynamic with the rest of the team.

Although the program implementer assigns a team manager, the members of the intern team assign the remaining positions among themselves. The team’s treasurer is responsible for tracking the team’s expenses and managing the budget, as well as working with the program implementer to manage the team’s logistics.

The program implementer holds meetings for team managers and treasurers from all of the campuses participating in the Green Campus Program at the convergences that happen each year. According to contacts, the treasurers’ meeting focuses on logistics and the program’s paperwork requirements, while the team managers’ meeting provides information and support to help those interns carry out their lead role on the intern team. The meeting also gives team managers from universities across California a chance to meet each other and network.

The Intern Handbook specifies roles only for the team manager and the treasurer; however, the program implementer has also defined roles for a secretary and a media relations person. The secretary, working with the team manager, carries out duties such as compiling the scope of work the team creates for each individual project into a larger document that campus leads and stakeholders can review. The secretary is also responsible for ensuring that notes are taken at each Green Campus meeting and uploading those notes to the program’s document-sharing website.

Interns are required to reach out to on- and off-campus media in an effort to build awareness of the Green Campus organization, and the intern assigned to media relations manages these efforts. The Intern Handbook recommends that the intern team hire a graphic designer or marketing



specialist to create brochures, posters, and other materials. This individual may or may not participate in the team's work in other ways.

Although the team manager plays a key administrative role, the Intern Handbook instructs intern teams to base their decisions on consensus and specifies that the team manager should have no greater decision-making authority than other interns have. The Handbook also specifies the roles of meeting facilitator and note taker for the weekly team meetings. The Handbook recommends that these roles rotate among the interns on a weekly basis.

Contacts said that new intern teams may feel overwhelmed by the work needed to achieve their goals. While the program implementer stated that campus leads provide guidance to help interns overcome these initial setbacks, the majority of the work the intern teams carry out is independent and self-directed. By taking this approach, the program implementer hopes to give the intern teams at each university enough autonomy and flexibility to pursue initiatives that address the unique needs of their campus. According to contacts, each member of an intern team is encouraged to lead at least one project each term and campus leads hope that the full team will take on a few additional projects, for a total of four to six projects per term.

→ **Implication: Intern teams largely work independently to design energy efficiency initiatives for their campus; the campus leads contribute to the generation of ideas and provide facilitation and support**

Workforce Development

The program implementer sees the Green Campus Program as a tool to facilitate the development of future energy efficiency professionals, although workforce development was not a primary goal for the 2006-2008 program cycle. For the 2009-2011 program cycle, Green Campus is categorized under the Workforce Education and Training Program and, consistent with that designation, the program implementer plans to further strengthen the program's workforce education and training focus as the program moves forward.

The program implementer invites energy efficiency professionals to speak to interns about careers in the field. The implementer emails to all Green Campus interns announcements for job openings related to energy efficiency of which the implementer is aware.⁶¹ The implementer also hosts a career day to connect interns with potential employers and with other internship opportunities, such as with utilities and energy service companies. The convergences that bring together Green Campus interns from across California provide further opportunities for interns to move toward careers in energy efficiency. At the July 2007 convergence, Edison hosted a

⁶¹ The implementer is active in many arenas in addition to Green Campus design and implementation. According to its website, "The Alliance to Save Energy promotes energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and greater energy security." Across its many activities and programmatic efforts, the organization becomes aware of numerous job openings.



training for Green Campus interns that included networking and career information presentations. According to contacts, some former Green Campus interns who have gone on to work in energy efficiency careers continued to mentor current interns, which became another source of career information for campus interns.

These efforts are consistent with other initiatives that seek to encourage college students to pursue careers in energy efficiency. However, some programs, such as Harvard's Council on Business and the Environment, have taken additional steps to provide information on careers in energy efficiency through partnerships with the university's career services center. Appendix F gives additional details on Harvard's energy efficiency efforts.

→ **Implication:** It appears the program could benefit from a review and assessment of other university-level workforce development activities related to careers in energy efficiency.

In addition to these career development efforts directed toward Green Campus interns, the program implementer would like to encourage universities to develop degrees focused on energy, including areas including energy efficiency and environmental issues. The *Green Campus Intern Handbook* encourages the establishment of for-credit classes on energy efficiency, led by Green Campus interns, as a means toward integrating energy efficiency information into the curriculum. Some participating universities currently offer courses on energy issues for academic credit and some offer academic credit to interns participating in the Green Campus Program. However, the implementer's ability to influence academic decisions appears to the evaluators to be limited. As the survey of interns conducted by the evaluation team shows (see Chapter 16), Green Campus interns largely do not share the program implementer's focus on developing energy education curriculum and integrating energy efficiency issues into current course offerings.

(For additional findings on program activities related to incorporating energy efficiency into academic offerings, see the subsequent section *Intern Efforts to Develop Energy Efficiency Curricula*, which is the last subsection under *Green Campus Intern Activities*.)

→ **Implication:** The Green Campus Program has begun to identify ways to serve as an on-campus resource promoting careers focused on sustainability. However, the program's efforts to reach a broader base of students by integrating energy efficiency issues into academic offerings have met with limited success to date at universities within Edison's service territory.

→ **Recommendation:** The program implementer should formally map out a strategic plan that documents its vision and mission related to workforce development, and articulate specific goals that are feasible over the short-, mid-, and long-term that



will support the objectives of the California Statewide Strategic Energy Plan related to green job workforce development.⁶²

Evaluation of Interns

Citing the rationale of intern turnover, staffing and budget limitations, and the limited time available during an academic year, the program implementer indicated that it does not conduct formal performance reviews of Green Campus interns. The program implementer relies on the weekly contact between campus leads and intern teams to evaluate in an ongoing process each intern's performance, and campus leads conduct individual meetings with interns as necessary to improve what they view as weak intern performance. In addition, the program implementer recognizes at the end of each year (at the convergence) outstanding individuals and teams that saved the most energy.

The *Green Campus Intern Handbook* and the scope of work that each intern team establishes every term lay out expectations for the work interns will carry out. When there are problems with an intern's performance, the supervisor – the campus lead – establishes a probationary period. Problems persisting at the end of the probationary period may result in the campus lead terminating the intern's employment contract. According to contacts, in such cases, the campus lead seeks input from other members of the intern team.

The EARTH Schools program manager hopes to create a more formal process to review interns' performance, as part of the program's efforts to increase the professionalism of the intern positions and better prepare the interns for future careers in energy efficiency. Contacts believe that performance reviews would give potential employers a tool to evaluate Green Campus interns. As one contact said, "We need a tool that tells us whether the interns are growing and achieving their goals." The EARTH Schools program manager also believes it is an important general principle that all paid staff have formal performance evaluations.

The program implementer recognizes the potential benefits of conducting formal reviews of intern performance. However, it expressed concern that a review process would be complex and time intensive, placing additional demands on campus leads and potentially detracting from the program's ability to meet its goals.

⁶² The goals related to green job workforce development laid out in the California Statewide Strategic Energy Plan are available at <http://www.californiaenergyefficiency.com/docs/EEStrategicPlan.pdf>, section 9, p. 74.



GREEN CAMPUS INTERN ACTIVITIES

Organization and Project Planning

According to contacts, Green Campus interns use the summer to plan for the coming academic year. Interns may also reach out to incoming freshmen over the summer or during residence hall move-in days. According to the program implementer, established intern teams may conduct a great deal of work over the summer, when campus stakeholders are more readily available to meet and devote time to Green Campus efforts. Teams largely made up of new interns generally focus on smaller projects through the fall semester as they learn their roles and build to a greater number of projects – and often more difficult projects – for the second half of the academic year.

Throughout the year, the Green Campus interns at each university are expected to come together as a team at least once each week. The *Green Campus Intern Handbook* specifies that these meetings must last at least one hour and that interns should take notes at each meeting and post them to the program's document-sharing website. The program implementer also expects interns to produce a monthly newsletter for distribution to stakeholders and other students throughout their university to publicize program accomplishments.

In addition to these activities, interns meet with program stakeholders at their campus, as discussed further in the section *Stakeholder Advisory Committees*.

According to the *Green Campus Intern Handbook*, intern teams should come together at the beginning of each term to set specific, measurable goals for their university that are consistent with the general goals of the Green Campus Program. Based on these goals, intern teams develop an action plan, or scope of work, giving details of all the projects they plan to carry out. This plan includes the time-frame of each project, specifies which interns will contribute, and includes plans for how the success of the project will be measured. As discussed below in the section entitled *Current Monitoring and Reporting*, interns report these success metrics on the *Project Summary/Evaluation Form*, which they upload to the *ProjectSpaces* website for campus leads to review. In addition, interns include measures of their success in the monthly newsletters that they provide to campus stakeholders and to their campus lead.

Although teams designate one intern to lead the team's efforts on each project, the program implementer expects that other members of the team will contribute as needed. The sample project action plan in the Intern Handbook suggests dividing each project into a set of tasks and assigning a team member to carry out each task.

Campus leads are involved in the creation of these plans and associated success metrics. According to contacts, the campus leads encourage interns to pursue a wide range of projects that reach out to a variety of stakeholders.

The program implementer recognizes that projects may vary in the amount of effort required from interns. However, the program implementer expects that each member of an intern team will lead at least one project each term and that the full team will take on a few additional



projects, for a total of 4 to 6 projects per term, and 12 to 15 over the full academic year. The Intern Handbook advises interns that they should pursue between three and five substantive projects each term.

→ **Implication: Campus leads encourage interns to pursue numerous and varied projects.**

Intern teams compile the action plans for each of the projects they plan to carry out into a team action plan for the term, which they submit to their campus lead. Campus leads review the action plans to ensure that the projects the interns plan to carry out fit within the timeframe of the 40-hour paid workweek allocated to each team. However, campus leads report it common for interns to work beyond their paid hours. According to the program implementer, campus leads also ensure that a team's heavy workloads and deliverables are spaced throughout the term.

Contacts said that intern teams are generally ambitious in their action plans and that the interns often want to take on new programs throughout the semester as they learn about new energy-saving technologies. The program implementer views action plans as iterative documents, and encourages interns to identify and start new projects at any time. According to contacts, the interns' action plans and weekly phone calls allow the campus leads to monitor the progress of the teams' projects.

→ **Implication: It appears that campus leads are aware of the activities of the intern teams they supervise and are able to track – through informal discussion and feedback – the interns' progress in carrying out projects.**

The *Green Campus Intern Handbook* encourages interns to involve campus stakeholders in the process of planning projects for the semester. According to the Handbook, stakeholder involvement in the planning process can both help the interns identify projects to pursue and ensure that they receive the stakeholder assistance they need to carry out their projects. According to the program implementer, interns present their completed action plans to campus stakeholders in meetings facilitated by the campus leads. Revised plans reflect stakeholders' comments.

The program implementer believes that by creating an action plan, Green Campus interns gain a sense of what they should accomplish and how their efforts fit into the program's goals. Contacts also cited the process of creating action plans as valuable professional development experience for interns. The program implementer includes these action plans as attachments in its monthly reports to Edison.

→ **Implication: The action plans that intern teams create have the potential to serve as a professional development tool, create clear expectations for the work interns will carry out, and define goals against which interns can measure program success.**



Efforts to Systematize Program Structure

Their in-person interactions with interns allow campus leads (employees of the program implementer) to monitor intern performance, address issues specific to each university, and support the unique projects interns design to meet the needs of their campus. However, there are significant constraints on the amount of time campus leads can devote to each university. With five campus leads supervising the Green Campus Program on 13 campuses for the 2006-2008 program cycle (four of which are campuses in Edison's service territory), it is evident each campus lead can support only a few campuses. Contacts recognized these time limitations and stated that the addition of more campuses would require the implementer to either add campus leads or reduce the level of in-person support provided to intern teams. In the next program cycle, there are plans to increase the number of universities participating in the Green Campus Program in Edison's service territory from four to six.

→ **Implication: As it is currently implemented, the Green Campus Program relies heavily on the campus leads, who are limited in the amount of time they can spend to support each campus.**

In an effort to help campus leads maximize their available time, the program implementer has begun to develop a set of core portfolio projects that campus leads propose to the intern team on each campus. During the 2007-2008 academic year, the program implementer began this effort with a fume hood energy competition, based on a successful program that interns at UC Irvine had carried out.⁶³ The program implementer also included energy-reduction efforts related to campus vending machines as a core portfolio project during the 2007-2008 academic year.

The implementer has since expanded the core portfolio of projects to include eight best practices, targeting energy efficiency efforts related to vending machines, lighting, campus dining services, laboratories, and computer systems.⁶⁴ According to the implementer, the core portfolio also contains best practices related to integrating energy efficiency into academic offerings and conducting energy audits. The convergences held at the end of each academic year allow the program implementer to identify projects that could be included in this portfolio and to learn about projects that have been successful on some campuses and could be implemented on others.

⁶³ Fume hoods are laboratory equipment that filter or vent to the outside of the building air contaminated with hazardous or unpleasant fumes. Fume hoods have a glass sash that laboratory workers can raise or lower over their work. While OSHA regulations do not allow fume hoods to be turned off, lowering the sash while the hood is not in use can result in significant energy savings because the motor moves a smaller volume of air through the filters or vents.

⁶⁴ These actions by the implementer occurred subsequent to the data collection activities supporting this evaluation. The evaluation team learned of the expanded core portfolio of projects through comments the implementer offered on the draft report.



- **Implication:** By putting in place elements like the core portfolio projects that give the Green Campus Program a more systematic structure, the program implementer can potentially increase the ability of campus leads to effectively support intern projects and activities.

Intern-Led Energy Efficiency Projects

The program implementer expects Green Campus interns to pursue a combination of projects designed to raise awareness of energy issues and projects designed to achieve measureable energy savings.

According to contacts, interns are able to publicize information throughout campuses and dorms, making students aware that they should conserve energy.

In the past, CFL exchange programs have been popular among interns seeking to pursue projects that will yield direct energy savings. However, as the Green Campus Program shifts from a resource program to a purely educational program, it will no longer support CFL exchanges.

Campus leads encourage interns to pursue projects that have been successful on other campuses and cite efforts to reduce the amount of energy used by laboratory fume hoods as an example of a successful core portfolio project that Green Campus interns have carried out across multiple campuses. According to contacts, while campus energy managers are reluctant to interfere with fume hoods because of OSHA (U.S. Department of Labor Occupational Safety and Health Administration) regulations that prevent the equipment from being turned off, interns have conducted campaigns for fume hoods that encourage users to lower the sashes of the hoods when they are not in use. With the sash lowered, the equipment continues to filter or vent air, but uses significantly less energy.

The survey of Green Campus interns (subsequently detailed in Chapter 16) found that in addition to energy conservation programs targeting laboratory fume hoods, which were part of the core portfolio of projects at the time the survey took place, interns across multiple campuses: carried out CFL-exchange projects; conducted audits of offices, buildings, or parking structures; and organized energy-saving competitions between residence halls.

Building and office audits comprise an important part of Green Campus interns' efforts to raise awareness of energy issues. According to contacts, Green Campus interns conduct building audits with a focus on identifying behavior change opportunities that could save energy at little or no cost. Approximately one month after completing an audit, interns contact the facilities staff to discuss the findings.

The Intern Handbook encourages intern teams to use their Green Campus funds to purchase sub-meters in order to monitor the energy use of individual buildings, especially residence halls. Recognizing that installing sub-meters will require a great deal of cooperation from campus stakeholders, the Intern Handbook describes the purchase of sub-meters as an investment by the



intern team that will support both building auditing and the measurement of project savings. Campus facilities managers – in their survey responses summarized in Chapter 16 – also emphasized the need for additional tools to allow interns to measure energy savings.

Yet, according to the program implementer, intern teams may not have the metering equipment they need to provide specifics on possible energy savings. Instead, interns use the information they gather in audits to generate strategies for reducing energy use more generally. The EARTH Schools program manager would like to increase the availability of building-level and plug-load meters so that interns can more effectively demonstrate through audits the possible energy savings that would result from efficiency measures.

- ➔ **Implication:** Formally documenting performance metrics that measure and track the impacts of intern activities, including building audits, may enhance the program's ability to demonstrate its value to campus stakeholders and build campus support for the program.
- ➔ **Implication:** Given the demands of auditing and project savings measurement, it seems appropriate for every Green Campus intern team to be supplied with metering equipment and trained in its use. If supplying building-level sub-meters is not cost-effective for the program, the intern teams could benefit from greater access to less-expensive equipment, like plug or circuit-load meters and PowerCost Monitors™.
- ➔ **Recommendation:** The program implementer should assess whether the auditing equipment available to interns is sufficient to evaluate the effects of intern-led projects and demonstrate the program's value to campus stakeholders. If additional equipment is needed to adequately measure energy savings, the implementer should formulate a concrete plan, specifying what equipment is needed, where it would be used, and the source of the funding to purchase the equipment.

Although the interns are not in a position to make decisions about building retrofits, they may research and recommend needed changes. Most of the recommendations that Green Campus interns make as a result of the audits they conduct are behavioral changes or small-scale operational changes. However, interns and stakeholders discuss Edison's incentives applicable to any retrofit or investment opportunities that interns identify.

According to the program implementer, interns have worked with campus energy managers and the UC/CSU/IOU Energy Efficiency Partnership program⁶⁵ to provide campus administrators

⁶⁵ The University of California (UC), California State University (CSU), and Investor-Owned Utility (IOU) Energy Efficiency Partnership is a unique, statewide energy efficiency program achieving cost-effective immediate and persistent peak energy and demand savings. It establishes a permanent framework for a sustainable,

continued...



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with information about retrofit opportunities and incentive programs. Contacts believe that the audits interns conduct are valuable in spreading information on this type of program. In addition, by including information on office audits in its reports to Edison, the program implementer provides Edison with an opportunity to contact the audited offices and directly promote any relevant energy efficiency programs. According to the EARTH Schools program manager, through the next program cycle, the Green Campus Program's contract will require interns to inform campus facility directors about available audits and nonresidential incentives from Edison.

➔ **Implication: Energy audits carried out by Green Campus interns have the potential to raise awareness among campus facility directors of Edison's nonresidential energy efficiency programs and to identify potential participants for those programs.**

Intern Efforts to Develop Energy Efficiency Curricula

The *Green Campus Intern Handbook* instructs interns to work to develop energy education curriculum and integrate it into the academic programs at their universities. The Handbook suggests that the university may be more accepting of Green Campus values were Green Campus-related ideas integrated into the university's academic offerings. The Handbook recommends interns seek approval from campus administration to lead for-credit classes on energy efficiency. The Handbook also suggests that intern teams seek approval from campus administration for academic credit to be awarded to active Green Campus interns and volunteers, and that interns organize panels, seminars, and lectures on fields related to energy efficiency.

The program implementer reported that interns have led courses on energy in collaboration with professors at three California universities, one of which is within Edison's service territory. In addition, the Green Campus Program has sponsored long-term energy-related assignments at two universities, both outside of Edison's territory.⁶⁶ The program implementer's record of non-resource activities carried out by Green Campus interns in 2006-2007 described these courses at one university within Edison's territory.⁶⁷ In that case, interns offered two for-credit classes called *Environmentally Preferred Purchasing*; five students enrolled in the fall semester 2005 class and seven students enrolled fall 2006. In each class, students researched a topic of their

long-term, comprehensive energy management program at the 33 UC and CSU campuses served by California's four large IOUs (PG&E, SDG&E, Edison, and SoCalGas).

⁶⁶ In order that the evaluation team might better understand the Green Campus Program as a whole, the team did not require implementation staff to restrict their remarks to universities in Edison's territory.

⁶⁷ Electronic file received from program implementer: *Alliance to Save Energy Green Campus_Non Resource Activities SCE 2006-07 with attendance.xls*.



choosing related to the course's theme. Students explored a range of topics, including the benefits of energy-efficient office appliances and lab equipment.

Contacts also reported that interns found opportunities for volunteers to receive academic credit at four universities and carried out academic workshops at one university. However, as the results of the intern survey detailed in Chapter 16 show, Green Campus interns at participating campuses in the Edison service territory give relatively low priority to these curriculum-related goals. The program's success in facilitating for-credit opportunities for students to learn about energy efficiency at six universities (five outside of Edison's territory) suggests that the low priority survey respondents expressed may not be representative of interns statewide.

→ **Implication: Green Campus interns at campuses in Edison's service territory give low priority to program goals related to developing academic offerings related to energy efficiency.**

In the 2006-2008 program cycle, Green Campus interns in the Edison service territory made an effort to partner with schools participating in the Green Schools program in order to teach high school students to conduct energy audits of their school and of small businesses in the area. However, Green Campus interns found it difficult to effectively communicate their own knowledge of energy audits and encountered behavioral issues when working with high school students that limited their ability to present information. Implementation staff said that other types of outreach programs in schools have been far more successful than efforts to conduct energy audits. For example, Green Campus interns received a much more positive response from elementary and high school students when they gave presentations that followed a script to present energy-saving information and tips. These presentations used the program implementer's *Energy Hog* and *Energy Buster* characters, which it developed as a national public service announcement campaign.⁶⁸

STAKEHOLDER ADVISORY COMMITTEES

Green Campus interns work with a stakeholder advisory committee made up of stakeholders – such as facilities managers, faculty, and other administrative staff within the university. According to contacts, although as many as 25 stakeholders may attend the advisory committee's meetings, each campus typically has between one and three stakeholders that are especially active with the Green Campus Program. The implementer considers the stakeholders that work most closely with the interns to be key participants in the Green Campus program. Some intern teams work very closely with their stakeholders, while at other campuses interns and stakeholders meet less frequently.

⁶⁸ Chapter 3 of this evaluation provides additional details about the *Energy Hog Traveling Road Show*, a scripted outreach assembly similar to the one Green Campus interns have presented. The Green Schools website, discussed in Chapter 5, also uses the *Energy Hog* and *Energy Busters* characters.



According to contacts, the connections to stakeholders that stakeholder advisory committees allow play an important role in the success of the Green Campus Program. The program implementer is not part of the faculty and staff of the universities where the Green Campus Program operates. Consequently, interns can recommend changes to promote energy efficiency, but have little power over whether those recommendations will result in significant changes. Relationships with campus stakeholders play a significant role in determining the influence that the Green Campus Program will have at any university.

Formation of Stakeholder Advisory Committees

Campus leads build connections with potential stakeholders – including energy managers, food service managers, residence life staff, and faculty – before the Green Campus Program begins to operate on that campus. The campus leads meet with these stakeholders to discuss possible projects interns might carry out that would help stakeholders achieve their goals, and the level of support that each stakeholder could provide to the program.

Contacts report that, once established on a campus, the program is popular and it is not difficult to find individuals willing to participate on the stakeholder advisory committees. Once established, the campus leads and interns make presentations to introduce various groups of faculty and administrators to the program. According to the program implementer, these presentations both create connections with new potential stakeholders and create opportunities for interns to pursue energy conservation initiatives in new areas. Existing advisory committee members advise the intern teams on involving additional staff members in a specific project or inviting them to join the committee itself.

→ **Implication: Future evaluations of the Green Campus Program might investigate stakeholder responses to the program across participating campuses, to identify practices that lead to successful stakeholder-intern collaboration and positive program outcomes.**

According to contacts, campus energy managers are on the stakeholder advisory committees at all participating campuses and have been active since the establishment of each of the committees. (Findings reported in Chapter 16 from the survey of interns corroborates the active participation of campus building operations staff.) Some campuses also have sustainability coordinators on staff. Energy managers and sustainability coordinators must meet efficiency targets, which can motivate them to work with Green Campus interns. Other university administrators and staff members who are accountable for campus energy use also serve on the advisory committees.

University housing staff, including residence life coordinators and residence assistants (RAs), is another group of stakeholders with whom Green Campus interns typically work. According to the program implementer, residence life coordinators are concerned with dorm energy costs and RAs are required to conduct educational programming in the form of brief presentations or facilitated discussions designed to help students transition effectively to college life. The Green



Campus Program may appeal to both groups by offering energy-use reduction strategies and student energy-conservation programming.

→ **Implication: By involving as stakeholders those university staff members whose positions require them to pursue goals complementary to those of the Green Campus Program – such as energy managers and residence life coordinators – the program implementer can improve the potential for interns to receive positive support from their campus stakeholders.**

On some campuses, Green Campus interns meet with RAs to provide information on incorporating energy conservation into their programs and to get the RAs involved in Green Campus efforts involving university housing. Contacts report that RAs often play a role in publicizing Green Campus projects and promoting them among residents of campus housing. RAs have also distributed CFLs. To recognize RAs' efforts, Green Campus interns at some campuses present a best motivator award at the end of the academic year to the RA who conducted the most outreach around sustainability.

The implementation contractor's listing of the non-resource activities carried out by Green Campus interns suggests that interns at some universities are involved with additional stakeholder groups addressing energy issues on their campus. For example, at one university in Edison's territory (UC Irvine), Green Campus interns serve as student representatives to the Campus Sustainability Committee, an inter-departmental group of faculty members and administrators working on sustainability. According to the implementer's description, Green Campus interns presented summaries of the work they had completed to this committee and shared programs planned for the future. The committee also recognized the interns for their efforts. Appendix F provides a summary of the sustainability efforts occurring institution-wide at each of the Green Campus universities within Edison's service territory.

According to the program implementer, campus leads communicate to interns about the importance of working with stakeholders when the interns are hired and throughout their work with the program. Even so, the survey of interns conducted by the evaluation team and discussed in Chapter 16 found that half of the interns said they were not aware whether a "stakeholder advisory committee" had been established on their campus. When implementer contacts were asked about this finding, they speculated that interns may know the committee by another name. The detailed analysis of the intern survey data (Chapter 16) largely support this assertion: The evaluator identified no clear differences between interns that reported awareness of the stakeholder advisory committee and those that did not with respect to the level of support they felt they received by administrators, facility staff, and faculty.

Committee Meetings

The full stakeholder advisory committee meets once per term, for a total of two meetings each year on campuses on the semester system and three meetings each year for campuses on the quarter system. However, interns generally meet with individual members of the committee more



frequently. Campus leads work with intern teams to create the agenda and serve as facilitators for meetings of the full advisory committee.

At the advisory committee fall meeting, Green Campus intern teams present their plans for initiatives to carry out during the coming academic year. The advisory committee meets again in the spring to consider interns' plans for the summer and the following fall. Interns also present information on ongoing and completed projects to the advisory committee.

According to the program implementer, Green Campus interns generally initiate stakeholder advisory committee meetings, however the campus lead may initiate stakeholder meetings if an intern team is largely made up of new hires and has not yet established relationships with the stakeholders. Contacts said that campus leads work closely with intern teams as they plan advisory committee meetings, and campus leads attend each meeting to ensure that interns maintain a positive relationship with committee members.

Through campus leads' participation in advisory committee meetings, the program implementer is able to provide regular consultation and guidance to campus stakeholders and address any problems related to the Green Campus Program. Campus leads also include agendas and reports from advisory committee meetings in their monthly narrative reports. Some intern teams record minutes from their meetings with stakeholders, although not all take this step.

According to the program implementer, the stakeholder advisory committee's meetings may be the only occasion when all of the individuals responsible for a campus's energy use come together. Especially in those instances where this is the case, these meetings can be particularly effective because students and lab workers may face different incentives related to energy use than energy managers or other administrators. By bringing these groups together, the Green Campus Program can find ways to address these issues.

➔ **Implication: It appears that bringing together all of the individuals responsible for a campus' energy use is an important benefit the Green Campus Program can provide. As a result, the opportunity exists for the program implementer to document situations where the Green Campus Program offers the only venue for all individuals responsible for a campus' energy use to come together collaboratively, in order to provide evidence of program influence to stakeholders and to Edison.**

CONVERGENCES

In addition to the stakeholder advisory committee meetings, the program implementer organizes two statewide convergences each year, which bring together the interns from each of the Green Campus universities, as well as stakeholders, including energy managers and housing directors from all of the universities participating in the Green Campus Program.

The convergences provide an opportunity for the interns and stakeholders to share their activities and lessons learned with their peers from other campuses through formal presentations, training,



and informal discussion. As the results of the intern survey show (Chapter 16), structured opportunities for interns to interact have been more effective in facilitating knowledge-sharing across universities than interns' attempts to contact their peers outside of formal, structured events.

→ **Implication: It appears that convergences offer a structured opportunity for interns to learn from the experiences of their peers at other universities and that this method of information exchange is rated higher by interns than informal communication approaches.**

The convergences also provide an opportunity for the program implementer to interact directly with stakeholder advisory committee members. According to contacts, the convergences allow the program implementer to provide training and share knowledge about new technologies. At the meeting held in August 2008, the program implementer hosted a sustainability workshop for chancellors from the University of California system and Stanford, the only private university participating in the Green Campus Program. According to the program implementer, Green Campus convergences offer a rare opportunity for campus facilities staff and administrators to discuss energy issues with their counterparts at other universities.

The Green Campus summer convergence is held in conjunction with the *UC/CSU/CCC Sustainability Conference*, an annual meeting between everyone working in sustainability in California's public higher-education system. As well as a day-long meeting of Green Campus interns that includes trainings and opportunities for interns to share their accomplishments with their peers from other universities, the program implementer hosts networking and planning sessions for the university staff members and administrators who attend. These networking sessions provide an opportunity for Green Campus interns to interact with people involved in sustainability and for program staff to better understand campus needs.

In addition, the UC/CSU/IOU Energy Efficiency Partnership gives its *Best Practices Awards* at the Sustainability Conference, and several Green Campus intern teams have been recognized in the *Student Energy Efficiency* category. The awards seek to recognize energy efficiency efforts that could be replicated across multiple campuses and that draw on multiple disciplines and include multiple stakeholders in their design. During the 2006-2008 program cycle, three Green Campus universities within Edison's service territory received these awards (California State University, San Bernardino; University of California, Santa Barbara, and University of California, Irvine).

GREEN CAMPUS LINKS TO OTHER EDISON PROGRAMS

The Green Campus Program has links to several other Edison efficiency programs.

In the 2006-2008 cycle, the program received some funding through the UC/CSU/IOU Energy Efficiency Partnership Program. According to the *California Evaluation Study Brief*, prepared



for the impact and process evaluation report conducted for the program, the UC/CSU/IOU Partnership Program:

“...aimed to obtain immediate and long-term energy and demand savings, and to establish a permanent framework for a sustainable, long-term, comprehensive energy management program at the affected campuses. The three program elements were: energy efficiency retrofits..., monitoring-based commissioning...[, and] training and education....”

According to Green Campus contacts, the university facility managers and other staff involved in the UC/CSU/IOU program welcomed Green Campus’s activities on their campuses, which led to the arrangement of financial support when the Green Campus Program encountered a gap in program funding. Also, according to the Green Campus implementer, the relationship between the two programs resulted in Green Campus interns providing assistance to facility staff working to implement energy savings. Green Campus interns have also contributed to school awareness campaigns conducted by some of the Green School Program participants.

The energy audits that Green Campus interns conduct provide another tie-in to Edison programs. The audits focus primarily on identifying no-cost and low-cost measures and behavior changes that would result in facility energy savings. In addition to the savings recommendations, the audit reports inform the facility director of Edison’s nonresidential efficiency programs.

→ **Implication: The energy audits produced by interns may offer Edison’s account representatives and nonresidential efficiency staff an opportunity to follow-up with the campus facility staff and pursue the identification of additional measures and applicable Edison incentives.**

The program implementer expressed a desire for Edison to provide more support to the Green Campus Program in terms of promoting the program and supporting its career development efforts. One Edison executive in particular has provided the type of support for the Green Campus Program’s career development efforts that the program implementer would like to receive on a broader scale. This Edison executive has attended Green Campus convergences and interacted with students in a way that allows interns to view him as a role model and a resource as they seek to begin energy-efficiency careers.

The implementer believes it could benefit from the public relations and publicity resources of Edison’s media and communications team. These sentiments are consistent with the findings of the intern survey (Chapter 16), in which several interns expressed a desire for more publicity in order to make the program better known. In addition, the student respondents to a survey conducted by the impact evaluation team suggested that the Green Campus Program would be more successful at the respondents’ universities if it had “a more active presence,” “more overall publicity,” and “greater outreach.”

During the 2009-2011 program cycle, the EARTH Schools manager has arranged to have Edison’s Mobile Education Unit support the Green Campus Program, as well as the other EARTH Schools programs. Edison anticipates that working with the Mobile Education Unit will give Green Campus interns an opportunity to better publicize their activities.



- **Implication:** It appears to the evaluation team that the program might benefit from increased partnerships with Edison in the arenas of professional development and overall visibility of the program on campuses, such as can be provided by the Mobile Education Unit. The program implementer and Edison program manager are encouraged to work together to identify additional appropriate, cost-effective roles for Edison.

MONITORING, REPORTING, AND CONTINUOUS IMPROVEMENT

Current Monitoring and Reporting

The intern teams must conduct a formal evaluation of each project within two weeks of its completion. Interns include the results of these evaluations on the program implementer's *Green Campus Project Summary/Evaluation Form*. The program implementer began requiring intern teams to complete these forms in the summer and fall of 2007 in an effort to document accomplishments and consider lessons learned in a consistent way for each project the interns carry out. As well as asking for details on the project and its budget, the form includes spaces for interns to report on hard metrics (including estimated annual energy savings and estimated annual energy cost savings), as well as soft metrics (including any survey results, attendance figures or signed pledges that the interns have collected). The form also asks interns to detail lessons learned from the project and to list any marketing or outreach activities conducted.

In the spring of 2009, the program implementer began requiring intern teams to submit to campus leads a spreadsheet detailing hard and soft success metrics at the same time that they submit their monthly newsletters. While this spreadsheet asks for much of the same information as the *Green Campus Project Summary/Evaluation Form*, it is designed to facilitate calculation of year-to-date accomplishments on each campus. The spreadsheet is more specific in the measurements it requires the interns to report than are the project summary forms. For example, the spreadsheet asks for the number of audit recommendations that have been taken and verified, and the energy savings that resulted from those changes. In contrast to the project summary forms, which provided a space for interns to report soft metrics generally, the spreadsheet also lists specific soft metrics on which the interns should report.

Interns also include the hard and soft metrics reported in these evaluations in monthly newsletters distributed to stakeholders and across their campuses. These newsletters vary across campuses. On some campuses, the interns provide a table summarizing their accomplishments; on others, the interns include their accomplishments in the text of stories about their activities. When the latter is the case, success metrics are usually presented in bold to stand out from the rest of the text. Neither the reporting forms nor the newsletters explicitly require interns to revisit the savings goals expressed in their action plans as part of the evaluation of their projects. However, the program implementer stated that interns do consider the goals laid out in their action plans as part of the evaluation process.



Interns report the number of CFLs exchanged monthly, although contacts stated that the need to constantly update and revise that information made accurate reporting difficult. Energy-saving programs based on reducing energy use from laboratory fume hoods and competitions between residence halls are reported quarterly. These reports may not include projects that achieved little success or for which data was not available on the report date. During 2008, the program implementer also submitted quarterly audit reports to Edison, giving details of intern-led projects and summarizing the implementer's records of audits that interns carried out during the previous three months. These reports include the number of offices or buildings audited and estimates of the amount of energy saved, the amount of carbon emissions avoided, and the cost savings that would result if campus stakeholders implemented all of the interns' recommendations. In the 2009-2011 program cycle, this information will be part of the program implementer's monthly report to Edison.

In the past, the program implementer measured the success of the Green Campus Program based on calculations of the amount of energy saved, largely as a result of CFL exchanges. The program implementer is working to compile this information into a running tally of the kilowatt hours of energy saved.

→ **Implication: Although Green Campus will be considered a non-resource program in the 2009-2011 program cycle, the program implementer should continue its efforts to compile a running tally of kilowatt hours of energy saved, because reporting these metrics plays a part in demonstrating the program's value.**

The EARTH Schools program manager is encouraging the program implementer to increase the consistency of intern reporting of accomplishments in order to allow comparisons between campuses. As part of this effort, the program manager has developed a chart, with input from the program implementer, that would facilitate uniform reporting across campuses. However, for such a reporting approach to be successful, it needs to be accepted by the other California utilities that are funding the statewide Green Campus Program, which had not occurred as of the time of this evaluation. The proposed reporting charts include information on energy savings, reductions in greenhouse gas emissions, audits completed, and other energy-saving changes the program achieved at a campus. Currently, the program implementer includes these charts as attachments to its monthly reports to Edison, although not all campuses provide the charts each month.

→ **Implication: It appears that the program could benefit by ensuring that the list of key performance indicators to be established for the 2009-2011 program cycle includes metrics (like those expressed in the chart that the program implementer and program manager have developed) that can be measured across all participating campuses to allow for comparison across program sites. (See Chapter 18 for suggested KPIs).**

The EARTH Schools manager is also encouraging the program implementer to develop performance indicators to measure changes in attitudes and behavior. These performance



indicators could rely on surveys of students conducted as part of Green Campus events or on larger-scale surveys seeking to gauge the attitudes and behaviors of the campus community as a whole. These measures will become increasingly significant, since the program implementer's contract to carry out the Green Campus Program through the next program cycle will include performance requirements.

Both Edison and implementation staff describe the current form of the monthly reports the implementation manager provides the EARTH Schools program manager as largely a legacy from decisions made by prior Edison Green Campus managers. (The current EARTH Schools program manager assumed program responsibilities in the first half of 2007; Green Campus had several Edison managers before his tenure.) Both Edison and the implementation staff expressed dissatisfaction with the current reporting format, which is a lengthy narrative document. Shortcomings of the current reporting format include the following: it is time consuming to prepare; it does not provide program status "in a glance," such as might be accomplished by tables or charts, and other steps to streamline the information; and it does not facilitate a comparison of activities across campuses, months, or years.

Contacts believe that by presenting these reports more clearly, the reports could more easily serve as a resource for future implementation staff and interns. The program implementer also expressed concern regarding the prospect of producing multiple progress reports for multiple program administrators throughout the state.

- ➔ **Implication:** All parties agree that the monthly reporting processes do not appear to be facilitating program management and need to be improved in order to be more effective.
- ➔ **Recommendation:** The program implementer and the EARTH Schools manager should collaborate to develop a new reporting template that is useful and feasible to adopt. The reporting process should include clearly defined roles and responsibilities for task ownership, due dates, and how the document will be used as a communication tool to facilitate continuous process improvement efforts, including the use of performance metrics.

Continuous Improvement

According to program implementation staff, they have made progress on all of the prior process evaluation recommendations. It was beyond the scope of the current evaluation to conduct an in-depth examination of all program reporting and to compare this reporting with what was done for the prior program cycle. Nonetheless, the information the evaluator obtained from the program implementer suggests that the implementer has taken steps to comply with the recommendations offered in the prior process evaluation regarding monitoring and reporting, as summarized in Chapter 14, subsection *Prior Program Evaluations*. If the implementer fulfills its plans to improve reporting, that would further meet the prior evaluation recommendations.



The program conducts continuous improvement activities through its management processes (described in detail in the above section *Program Structure*, subsection *Program Administration*). Specifically, the direct implementation team – comprised of campus leads – meets bi-weekly to discuss intern activity, progress, and challenges, and the education team – including the implementer’s management and senior management staff – meets weekly to discuss the organization’s educational programs overall.

In addition to these activities, the program implementer gains a sense of the success of Green Campus initiatives at each campus through campus leads’ interactions with interns and stakeholders, and their observations during campus visits.

The two annual convergences also provide an opportunity for self-evaluation. Interns fill out questionnaires at the convergences that seek to evaluate both the event and their overall experience with the Green Campus Program.





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16 GREEN CAMPUS ASSESSMENT FROM SURVEY FINDINGS

This chapter presents the findings from a web survey of Green Campus student interns conducted for this process evaluation. Twelve of the 17 interns for the four campuses in Edison's territory responded to the web survey. The sample of 12 responses from the population of 17 interns in Edison's territory provides greater than 90/10 confidence/precision.

Of the respondents: two came from CSU, San Bernardino; three from UC, Santa Barbara; three from UC Irvine; and four from Cal Poly Pomona. The survey respondents also had varying levels of experience as Green Campus interns, with some having held the position for as little as three months, while others had been interns for more than a year.

In addition to findings from the process evaluation team's intern survey, this chapter presents the process-related findings from the impact evaluation surveys conducted by the impact evaluation team.

The chapter is organized into the following sections:

→ **Goals**

- Increasing Students' Energy Efficiency Actions
- Increasing Energy Awareness
- Creating Partnerships
- Developing Efficiency Curricula

→ **Projects Carried Out**

→ **Intern Roles and Activities**

→ **Campus Engagement**

→ **Green Campus Stakeholder Committees**

→ **Satisfaction with the Green Campus Program**

→ **Findings from Impact Survey Efforts**

- Green Campus Facility Manager Respondents to Impact Survey for Facility Managers
- Green Campus Intern Respondents to Impact Survey for Interns



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GOALS

For the most part the goals interns listed for the Green Campus Program at their university were consistent with Green Campus' organizational goals. The evaluation team, with agreement from Edison and the program implementer, expressed these program goals in the survey as follows:

- ➔ Increase awareness of the relationship between energy and the environment among students.
- ➔ Increase awareness of the relationship between energy and the environment among faculty, staff, and administrators.
- ➔ Increase students' actions that save energy on campus.
- ➔ Create partnerships among students, faculty, and staff that lead to ongoing energy efficiency.
- ➔ Develop energy education curriculum.
- ➔ Integrate energy education curriculum into existing academic offerings.

Prior to presenting the responding interns with the above statement of goals, the survey asked respondents to "briefly describe in your own words the top three goals established for the Green Campus Program on your campus for the 2007/2008 academic year." (The text below terms these answers to the open-ended questions as the *articulated* or *unprompted* goals.) For each goal articulated, the respondents were asked to rate (*high, medium, or low*) what they felt to be the degree of success for this goal.

Subsequent to this set of questions, the survey listed the program goals (see the above list) and asked each intern to characterize each of these goals as *key, secondary, or minor* for their team over the past year. (The text below refers to these answers as characterizations of the *stated* goals.) Subsequent to this importance rating of the stated goals, respondents were asked to rate (*high, medium, or low*) what they felt to be the degree of success for this goal.

Increasing Students' Energy Efficiency Actions

Among the 36 goals that the 12 interns articulated without prompting, a plurality (11) fell under the organizational goal of increasing student actions that save energy on campus. When subsequently asked to rate the importance of this institutional goal, ten of the twelve respondents stated it was of key importance; two interns rated it of secondary importance. In addition to stating that they hoped to change students' behaviors, four of the surveyed interns specified that they hoped to achieve measurable energy savings as a result of that behavior change. Six of the interns felt that they were highly successful in achieving their goals focused on behavior-change, while four felt they were moderately successful, and one felt the success rate was low.



The interns' judgments of which projects participating students appreciated most demonstrate the general perceived success of projects that sought to achieve behavior-change goals. Four respondents listed dorm competitions among those that participants most appreciated and three listed CFL exchanges.

However, four interns identified energy-saving competitions as the projects they felt were least successful. Two of those interns, from the same university, elaborated to say that they found it difficult to motivate students to participate in the competitions. One intern stated that campus housing administrators were difficult to work with and the fourth did not elaborate on his or her answer.

- **Implication: Survey findings suggest that Green Campus interns embraced program goals related to increasing students' actions to save energy and largely felt they had succeeded in achieving these goals.**

Increasing Energy Awareness

Many of the interns reported that efforts to increase awareness were most satisfying to them. Four interns mentioned educating others about energy efficiency as one of the activities that gave them the most satisfaction. The vast majority of interns also claimed that increasing awareness was a key part of the program they implemented at their university. All but one (11 of 12) said that raising awareness among students was of key importance, and seven respondents felt that raising awareness among faculty, staff and administrators was of key importance.

However, fewer of the goals the interns identified in their unprompted responses fell under the organizational goals of increasing awareness of the relationship between energy and the environment. Among all the goals that the interns identified in the open-ended questions, four concerned raising awareness among students, four dealt with raising awareness among faculty, staff, and administrators, and two addressed raising awareness among the campus community as a whole.

A slight majority of the interns (7 of 12) rated their success at raising awareness among students as medium, while four felt it was high and one felt it was low. Four interns felt they had a high level of success raising awareness among faculty, staff, and administrators, six felt they had a medium level of success, and one felt they had a low level of success.

- **Implication: While interns found efforts to raise awareness satisfying, they felt those efforts achieved mixed results overall.**
- **Recommendation: The program implementer should conduct an assessment of student awareness-raising activities across multiple campuses to identify what strategies are working well and which ones are not as successful to identify best practices for future intern training and development.**



Creating Partnerships

Many of the interns articulated goals for their campus that were consistent with the organizational goal of creating partnerships between students, faculty, and staff that lead to ongoing energy efficiency. Seven of the goals interns articulated for the open-ended questions dealt directly with building coalitions between the Green Campus group and other members of the campus community. In addition, six goals addressed building the Green Campus' organization at a given university and increasing awareness of the Green Campus group. While not directly related to building relationships in the community, these objectives would likely help the group sustain itself and continue its program into the future.

Five of the interns rated the stated program goal of creating partnerships as of key importance, six rated it of secondary importance, and one rated it of minor importance. Half of the interns felt that they achieved a medium level of success in the goals they articulated relating to creating partnerships, one-fourth felt they achieved a high level of success, and one-fourth felt they achieved a low level of success.

Developing Efficiency Curricula

The majority of the interns surveyed (9 of 12) rated the stated goal of developing energy education curriculum as a minor goal, while an even stronger majority (11 of 12) rated as minor the stated goal of integrating energy education materials into existing curriculum. None of the respondents articulated in their open-ended discussion of their top three goals the development of energy education curriculum or the integration of such curriculum into current academic offerings. Perhaps not surprisingly, given their rating of these stated goals as *minor*, the vast majority of interns (10 for developing curriculum and 11 for integrating energy education materials) felt that they achieved a low level of success in accomplishing these goals.

→ **Implication: Interns give low priority to Green Campus goals of creating energy education curriculum or integrating energy education into current course offerings and report attaining little success.**

PROJECTS CARRIED OUT

Green Campus interns at the four universities carried out a wide range of projects. Interns at all four universities took part in CFL exchange projects and audits of offices, buildings, or parking lots to identify opportunities for energy savings. Two of the campuses organized energy-saving competitions to motivate students and reward those who achieved the greatest reductions in their energy use. Events and movie showings were also common initiatives to build awareness of energy efficiency efforts, and interns on two campuses focused on energy-saving projects related to fume hoods in laboratories.

Most of the interns surveyed (9 of 12) mentioned three (4 interns) or four (5 interns) projects when asked what projects, activities, or events they had participated in during the past year. The



remaining three interns reported participating in one, six, and nine projects – the latter reported by the most experienced intern.

Interns from campuses that had been part of the Green Campus program longer mentioned taking part in more projects than interns from campuses that were newer to the program. Two of the campuses in Edison's service territory, UC Santa Barbara and CSU San Bernardino, began participating in the Green Campus program in 2004. All of the respondents from these two campuses listed four or more projects in which they had participated. Only one respondent each from UC Irvine (which entered the Green Campus program in 2005) and Cal Poly Pomona (which entered the program in 2006), reported participating in four or more projects.

The interns surveyed by the evaluation team listed a total of 27 unique projects that took place at the four universities during the 2007-2008 academic year (see Appendix G). A review of the program implementer's record of non-resource activities revealed nine additional projects, all designed to raise student awareness, for a total of 36 projects. Eleven of those projects took place at UC Santa Barbara, ten at UC Irvine, eight at CSU San Bernardino, and six at Cal Poly Pomona.

Recognizing that the interns surveyed may not have reported all of the projects carried out on their campus and that Green Campus interns who did not respond to the survey may have carried out additional projects, this average of nine projects per campus per year is in line with the *Green Campus Intern Handbook's* recommendation that intern teams should pursue between three and five substantive projects per term. These findings also approach the program implementer's estimation that intern teams will carry out twelve to fifteen projects over the academic year, recognizing that Cal Poly Pomona had entered the Green Campus program relatively recently and that CSU San Bernardino has a large proportion of students who commute rather than living on or near campus. (See the section entitled *Organization and Project Planning* in Chapter 15 for a discussion of differences among participating campuses.)

A plurality (10) of the projects that the interns reported in the survey sought to raise awareness of energy use among students. Five of these projects consisted of events, including Earth Day celebrations and film screenings, while others included a range of awareness and education initiatives. As reported in Chapter 15, the program implementer stated that these initiatives to raise awareness are easier for interns to carry out than energy audits and direct energy savings activities, which are likely to require more resources and labor. However, as stated above, the interns felt they had mixed results in their efforts to raise awareness through these activities.

Seven of the projects that the interns carried out sought to raise energy efficiency awareness among faculty, staff, and administrators. All of these initiatives involved energy audits of offices or buildings. The interns also listed nine projects designed to lead to direct energy savings. These projects included CFL exchanges, energy competitions, and a delamping campaign.

The interns surveyed listed only one project that sought to develop energy efficiency curriculum, an effort to teach energy efficiency in public elementary schools.



According to the program implementer's records,⁶⁹ Green Campus interns took part in a wide variety of activities to spread information about energy efficiency and publicize their efforts, in addition to their larger projects. These efforts included placing posters in residence halls and updating them to advertise new initiatives and events, sending energy-saving tips through regular emails, advertising in student newspapers, and reaching out to news outlets on and off campus through press releases. Green Campus interns have also applied for and received awards recognizing their efforts and drawing attention to the Green Campus Program. Green Campus intern teams have received a great deal of recognition through the UC/CSU/IOU Energy Efficiency Partnership's *Best Practices Awards*. Green Campus intern teams from throughout California have received all of the Partnership's awards in the *Student Energy Efficiency* category since 2004.

INTERN ROLES AND ACTIVITIES

Of the 27 projects that Green Campus interns listed across the four universities, 14 were listed by only one intern each, suggesting that that individual was the only intern who worked on those projects.⁷⁰ Of the remaining projects, two received input from four interns, two received input from three interns, and nine received input from two interns. The survey results suggest that Green Campus interns collaborate as a full intern team for a minority of their projects.

Six projects received mention by all of the interns at the university where they took place. Three of these projects occurred at CSU San Bernardino, which had only two interns, one project was at UC Santa Barbara, which had three interns, and two projects were at Cal Poly Pomona, which had four interns.

→ **Implication: Although the Intern Handbook states that interns will require support from other team members to complete projects successfully, the survey data suggests that a large portion of Green Campus projects are conducted by a single intern and the intern team as a whole collaborates on projects less than a quarter of the time.**

A comparison of intern's responses to the role they played on their team with the activities they reported taking part in over the past year suggests that the interns' activities were largely flexible, regardless of their official roles within their teams. Three of the 12 surveyed interns reported they did not have an explicit, designated role within the organization or reported they were simply a "member." Three interns reported they carried out multiple roles within the organization. Of the six interns who listed specific roles, only one intern reported taking part

⁶⁹ Electronic file received from program implementer: *Alliance to Save Energy Green Campus_Non Resource Activities SCE 2006-07_with attendance.xls*.

⁷⁰ At a minimum, the intern was the only one involved in the project among the 12 interns that responded to the web survey, out of 17 total interns.



solely in activities that clearly fell within that intern's role. This individual listed his or her role as "publicity," and took part in a range of projects to raise awareness of energy efficiency.

These findings from a comparison of intern roles and activities may result because many of the specific roles the interns listed were largely administrative. Consistent with the roles that the program implementer set out for intern teams, interns defined their roles as team leaders, team co-leaders, treasurers, secretaries, and publicity. The survey data suggests that these administrative roles were not the only focus of the people who carried them out. For example, while team leaders reported carrying out activities like organizing club meetings and managing other interns, they also planned and executed a wide range of initiatives. The individuals who listed their roles as secretaries and treasurers did not mention the administrative duties they carried out when they listed the activities and events they were involved in.

An online job posting the evaluators discovered suggests that the Green Campus Program at California State University, Humboldt may have defined additional roles within the intern team, at least for interns receiving only academic credit. The posting states that interns will fill one of three roles within the Green Campus Program: coordination of office energy audits, coordination of events and tabling, and coordination of public relations and outreach. These roles imply a division of labor within the Green Campus intern team that goes beyond the administrative roles that the interns surveyed reported carrying out and the program implementer and Intern Handbook describe.

→ **Implication: Green Campus interns' administrative roles within their teams are not correlated with the majority of the work each intern carried out. The Green Campus Program at California State University, Humboldt, has defined roles for interns that encompass more than their administrative duties. While it is necessary to assign administrative duties to interns, defining broader intern roles, as CSU Humboldt seems to have done, may better align the work interns carry out with their role on the intern team.**

The factors the interns listed that make it difficult for their campus to move forward with energy efficiency suggest another element that may contribute to the wide range of activities that each intern carried out. Four interns responded either that the busy schedules of Green Campus interns limited their ability to move forward with energy efficiency or that their intern team was too small. One additional respondent said that new and inexperienced interns had hindered their group's efforts to move forward. These constraints around time and staffing suggest that the interns may have taken on whatever projects they felt they had the time and ability to complete.

→ **Implication: Survey findings suggest that Green Campus interns take on a wide variety of duties and work on a range of initiatives as their skills and time constraints allow.**



CAMPUS ENGAGEMENT

The interns were asked to rate the level of interest in Green Campus objectives and the willingness to participate in Green Campus events of students, faculty, building operations staff, and administrative decision-makers. In general, the interns reported that building operations staff were both most interested in Green Campus objectives and most willing to participate in Green Campus events. One intern wrote that the building operations staff seemed more aware of Green Campus Programs and objectives than did the student body on his or her campus. However, another intern from the same university said that building operations staff seemed reluctant to trust the expertise of the interns and were unlikely to change their habits unless they were directed to do so by administrative decision-makers.

In general, interns also gave high ratings to administrative decision-makers, both in terms of their interest in Green Campus objectives and their willingness to participate in events. In short-answer responses, interns said that administrators were often more receptive to Green Campus projects than students or even faculty. However, while administrators may have been initially receptive to Green Campus initiatives, interns found it difficult to motivate them to significantly change their behavior.

All of the interns from one university and two of the three interns responding from another university identified their schools' administrators among factors that make it difficult for their campus to move forward with energy efficiency. However, these students also gave relatively high rankings for administrative decision-makers' interest in Green Campus objectives and willingness to participate in Green Campus activities. A closer examination of the short answer responses suggests that while administrators may have been receptive to Green Campus ideas and willing to participate in events, the interns encountered resistance in achieving meaningful behavior change. One student wrote that administration "gets excited then drops the ball," while others used terms like "bureaucracy," and "a university that is stuck in its ways," to describe the problems they encountered. A student from another university mentioned the difficulty in motivating behavior change among administrators within a large university system.

→ **Implication: While administrative decision-makers may be receptive to Green Campus objectives and willing to participate in events, interns reported difficulty in motivating significant behavior change among administrators.**

The interns reported that both students and faculty were less interested in Green Campus objectives and less willing to participate in events than building managers and administrative decision-makers. Some of the interns speculated that this is likely because administrators and building operators feel a greater degree of accountability for campus energy use than students or faculty members.

In addition, the interns surveyed gave the students at their universities a higher rating in terms of their willingness to take part in events than they rated student interest in Green Campus objectives. According to one intern, students would participate in outreach events and contests in



order to get incentives, but they did not appreciate the objectives motivating the event. In a related finding, four other interns mentioned incentives in their response to a question regarding which projects students appreciated most.

→ **Implication: It appears that research into students' attitudes and behaviors related to energy efficiency might support the social marketing efforts.**

Responses to a survey of students at Green Campus universities conducted by the impact evaluation team provide additional details about students' views toward the Green Campus Program and their willingness to participate in events. (See the discussion of this survey in the last subsection of this chapter, *Student Responses to Impact Survey*. In particular, note the reasons suggesting the survey results are not representative. The results are discussed here because they appear to amplify the findings from the process evaluation survey of interns.)

The students surveyed by the impact evaluation team generally rated highly their campus' enthusiasm for the Green Campus Program. Thirteen respondents rated the enthusiasm of the campus community at a "7" or above on a scale of "0- to-10," and none rated the campus community's enthusiasm below a "4" (four students did not respond to this survey question and two replied that they do not know). The responses to the student survey regarding enthusiasm for the Green Campus Program might be due to the willingness of students to participate in Green Campus events to a greater extent than students' interest in Green Campus objectives.

GREEN CAMPUS STAKEHOLDER COMMITTEES

Although students from each university reported that Green Campus "stakeholder advisory committees" had been established on their campus, half of the interns surveyed reported they were unaware of these committees. Possibly, the interns who said they were unaware of the committees either referred to the committees by a different name or carried out their duties as an intern without interacting with the committee.⁷¹

Respondents who had been Green Campus interns for more than six months were more likely to state that they were aware of a "stakeholder advisory committee" than those who had been hired more recently. Four of the six interns who had held their position for more than six months were aware of the committees, while only two of the six interns who had held their positions for six months or less were aware of them.

For the most part, there is no discernable difference in the relationship between stakeholders and the students who knew of the committees as compared to the relationship between stakeholders and students who did not know. Intern responses as to the interest in Green Campus objectives

⁷¹ The evaluation team, when designing the survey, asked the implementation team to provide the name commonly used for the committee. Nonetheless, there may be variations in terminology among campuses or interns.



and willingness to take part in Green Campus activities on the part of faculty, administrative decision-makers, and building managers were mixed, regardless of whether interns reported awareness of the committees. Awareness of a Green Campus stakeholder advisory committee similarly does not seem to influence interns' overall satisfaction in working with the Green Campus Program.

However, participation in Green Campus stakeholder committees may have influenced interns' views toward the budget constraints their university faces in implementing energy-saving projects. Four interns listed budget constraints as a significant factor making it difficult to move forward with energy efficiency. Of those four respondents, three were aware of the stakeholder advisory committee on their campus. This suggests that interns who were aware of the Green Campus stakeholder committees may have worked more closely with stakeholders and developed an understanding of the concerns facing their university on a broader level than interns not involved in the committees. The amount of time an intern had spent in their position may also have influenced that intern's views toward budget constraints. Three of the four respondents who listed budget constraints as a significant factor limiting their ability to move forward with energy efficiency had been Green Campus interns for more than six months.

SATISFACTION WITH THE GREEN CAMPUS PROGRAM

The interns generally gave high rankings to their overall satisfaction with working for the Green Campus Program. Ten of the 12 interns surveyed rated their experience a "4" or a "5" on a five-point scale, while two interns rated their experience a "3." Those two interns generally gave lower ratings to their interaction with the program implementer than did the other interns. One of the two less-satisfied interns made comments throughout the survey that suggest that he or she disagreed with the leadership and overall strategy of their particular intern team. Other factors separating those two less satisfied respondents from the rest of the interns were not apparent from the data.

In general, the interns gave high ratings to the support the program implementer provided to them. Ten of the 12 interns surveyed rated the technical information the program implementer provided to them a "4" or "5" on a five-point scale. Eleven interns rated information and assistance relevant to their campus and timeliness of responses at a "4" or "5," and 10 respondents rated the assistance other than information provided by the program implementer at a "4" or "5." Interns also generally gave high ratings to the professional development and networking opportunities available. While these high ratings may reflect a certain level of bias, since the interns were asked to rate their employer, the ratings likely also reflect the high level of personalized assistance that campus leads reported providing to the intern teams they supervise.

→ **Implication: Interns were generally satisfied with their experience working for the Green Campus Program and reported receiving a high level of support from program implementation staff.**



Of all their interactions with the Green Campus Program, interns gave the lowest ratings to the opportunities available to confer with interns at other universities. In their comments elaborating on these responses, interns said that they had trouble “getting a hold of” interns at other campuses or that interns at other campuses were “unresponsive.” Interns also gave relatively low ratings to their ability to learn from the experiences of other universities, as might be expected, given the key role that conferring with interns at other universities would likely play in learning about the experiences of those universities.

However, the interns gave higher ratings to their ability to learn from the experiences of other universities than they did to their ability to confer with their peers at those universities. This difference is likely a result of structured events and opportunities, including convergences and the program website, that the program implementer has created to facilitate communication between interns. Eight interns rated the *Green Campus ProjectSpaces* website a “4” or “5” on five-point scale, and one intern mentioned the benefits of networking and sharing ideas at the convergences.

These responses suggest that interns found it difficult to connect with their peers at other campuses outside of the structured opportunities provided by the Green Campus Program, such as the convergences. This may have been a result of interns’ busy schedules, to which they attributed some of the difficulty they faced in carrying out Green Campus activities. Interns may have given a low priority to responding to requests by their peers at other universities.

→ **Implication: Survey results suggest that interns had trouble connecting with their peers at other universities outside of convergences and other structured Green Campus events. The program implementer might investigate additional channels that could facilitate peer-to-peer communication among interns.**

Even in light of the generally favorable ratings that interns gave to the *Green Campus ProjectSpaces* website, the difficulties that interns reported in connecting with their peers at other universities and learning from their experiences suggest the possibility that the website does not meet its full potential in that area. One program implementation staff member referred to the document sharing website as “unwieldy,” and a cursory review carried out by the evaluation team found the amount of information the website provides and the organization of that information difficult to navigate. For example, the program implementer’s outline of the folders contained on the *Green Campus ProjectSpaces* website spans, when printed, 20 hard-copy pages. Additionally, the evaluation team arbitrarily selected 20 website pages and scanned them for documents dated between September and November 2008. This review identified 10 to 15 document links on each page, for a total of 200 to 300 documents posted in that three month period.

→ **Implication: There may be an opportunity to make the *Green Campus ProjectSpaces* website a more effective tool to facilitate sharing of information among interns across campuses by organizing the information the website provides more efficiently.**



FINDINGS FROM IMPACT SURVEY EFFORTS

As discussed in Chapter 14, subsection *Evaluation Objectives and Methodology*, the process evaluation team wrote about a half-dozen questions to include in the impact evaluation surveys being conducted for the program by The Cadmus Group, Inc., working as a subcontractor to KEMA, Inc. The impact evaluation team fielded surveys of participating campus facility managers, interns, and students at participating campuses for an analysis of impacts of the statewide Green Campus Program. While the impact team evaluated the Green Campus Program across the entire state of California, the data presented here includes responses only from universities within Edison's service territory.

Four university facility managers completed the facility manager impact survey, ten interns completed the intern impact survey, and 27 students responded to the student impact survey. Note that the sample sizes of all three groups are too small to be considered statistically representative of the populations of facility managers and interns; in addition, the student sample suffered from sampling bias, as elaborated on in the section presenting the student results.

Although the impact samples cannot be considered statistically representative of their corresponding populations, the evaluation team provides the results here as potentially suggestive of the populations' responses.

Facility Manager Respondents to the Impact Survey for Facility Managers

None of the four university facility managers who completed the survey reported problems incorporating the program at their campus. Three of the four facility managers reported that the program met their expectations, giving it a rating of "9" or "10" on a "0-to-10" scale. The fourth facility manager rated the program at "0" in terms of meeting his or her expectations, stating in open-ended responses that initial guidance, funding, program development, and financial accountability could have been improved.

This respondent further criticized a lack of funding support and slow reimbursements from the program. One other facility manager surveyed, who came from the same university as the manager that provided a "0" rating, also reported funding as something that the program could improve, and one additional respondent mentioned that facility managers at their university had paid the interns' hourly salaries. The evaluators are unable to assess this situation beyond reporting the survey results; however, these comments may stem from difficulties surrounding the gap funding that the UC/CSU/IOU Efficiency Partnership Program provided to Green Campus during the 2006-2008 cycle, as discussed in Chapter 15, subsection *Green Campus Links to Other Edison Programs*.

Other factors that the facility managers mentioned in response to how the Green Campus Program could improve included the availability of student interns. According to one facilities manager, the interns give first priority to their academic commitments, which reduces their availability to the Green Campus Program. Findings from the process evaluators' survey of



Green Campus interns (above) support this point. Several interns mentioned time constraints as a factor limiting their ability to carry out Green Campus activities. The facility managers surveyed through the impact evaluation said that additional interns could alleviate these scheduling and availability issues. Respondents also cited a need for additional tools to measure energy-saving efforts.

In general, the facility managers surveyed believed their campus communities were enthusiastic about the Green Campus Program. Two managers rated the enthusiasm of their campus community at a “10” on a “0-to-10” scale and two managers rated campus enthusiasm as an “8.” The facility managers surveyed also gave positive reviews to the program when asked if they had any additional comments for program sponsors. The facilities managers cited the program’s benefits for the student interns and the ability of interns to reach out to campus communities.

Intern Respondents to the Impact Survey for Interns

Eight of the 10 student interns who responded to the impact survey stated that they had difficulties completing Green Campus activities. The interns listed a wide variety of reasons for these difficulties, some of which overlapped with their responses to the question of what the Green Campus Program could have done better. For example, one intern cited his or her lack of experience with energy efficiency as a factor that caused difficulties in completing Green Campus activities, and three additional interns listed a desire for further training as something that the program could have done better. All of the interns surveyed from one university in particular mentioned additional training as a way the program could improve.

➔ **Implication: Survey data suggests that additional training would help interns carry out Green Campus activities more effectively. The program implementer might address this need by seeking feedback from interns a few months after their initial orientation on areas in which they feel they could benefit from further training or support.**

In their responses to the question of what factors caused problems in completing Green Campus activities and the additional comments they had for the program implementer, the interns identified a variety of barriers that they felt limited their efforts. Two interns mentioned a desire to better publicize the Green Campus Program. In addition, two interns stated that the Green Campus Program’s scope is limited, with one elaborating that it does not include promotion of renewable energy.

The student interns who responded to the impact survey gave relatively high ratings regarding the extent to which the Green Campus Program met their expectations. Nine of the ten interns gave ratings of “7” and above on a “0-to-10” scale. In their comments addressed to the program implementer, four of the interns supported these ratings with comments about their satisfaction with the program, saying that their “efforts are taken seriously” and that the program is “money well spent.”



While the interns surveyed gave relatively high ratings to the enthusiasm of the campus community, their ratings were generally lower than those ratings given by the facilities managers who responded to the impact survey. Four of the interns surveyed rated the enthusiasm of the campus community at “8” on a “0-to-10” scale, while three interns rated it at “6.” Two of the remaining three interns rated the campus community’s enthusiasm for the Green Campus Program at a “9,” and one intern rated it a “10.” One of the Green Campus Interns reported difficulty getting students involved in the program as an obstacle they faced in carrying out Green Campus activities. These impact survey findings are consistent with the ratings interns participating in the process evaluation survey gave regarding the campus community’s receptiveness to Green Campus objectives and willingness to participate in Green Campus activities, as detailed earlier in this chapter.

All of the ten interns responding to the impact survey rated the support they received from the Green Campus program implementer an “8” or higher on a “0-to-10” scale. However, three of the interns also cited a desire for additional support from the program implementer. These interns used terms like “over-extended” to describe the program implementer, cited a desire to meet with campus leads more frequently, and stated that they would like more support on individual projects.

Interns responding to the process evaluation survey detailed above echoed these views about the value of the support they received from the program implementer and the desire for more frequent contact with campus leads. One respondent to the process evaluation survey stated that the program implementer’s advice would at times reflect conditions at other universities in other parts of the state, rather than conditions at their own university. In this intern’s opinion, by visiting the campuses they supervise more frequently, campus leads would be able to better understand the unique culture and characteristics of each university. This knowledge would allow campus leads to provide support that better meets the needs of the Green Campus interns they supervise.

These responses support the findings from the program implementer’s interviews discussed in Chapter 15 that detail the instrumental role campus leads play in program success, as well as a recommendation to this effect from the prior evaluation, as summarized in Chapter 14.

→ **Implication: It appears that while interns appreciate the assistance they receive from program implementation staff, they would like additional support, especially targeted toward individual projects.**

Student Responses to the Impact Survey for Students

Between May and July 2008, the impact evaluation team received 27 responses to a web survey of students at universities within Edison’s service territory participating in the Green Campus Program. The respondents disproportionately represented two universities, with 12 students responding from UC Irvine and 13 from UC Santa Barbara. Only one student from CSU San Bernardino and one student from Cal Poly Pomona responded to the survey. In addition to this



disproportionate representation from two universities, it was unclear whether and to what extent the survey respondents were involved in the Green Campus Program. Because the impact team relied on the Green Campus interns to publicize the survey, it is likely that many of the respondents were either close to the interns or directly involved in the Green Campus Program. At least one respondent was a Green Campus intern.

As a result of the sampling bias described above, neither the impact evaluation team nor the process evaluation team view the students surveyed as representative of students across the four Green Campus universities in Edison's service territory. Therefore, the survey's ability to provide meaningful information about typical interactions between students and the Green Campus Program is limited. However, in a few areas, data from the student survey provides further context for information gathered from interviews with the program implementer and from the surveys of interns carried out by the impact and process evaluation teams. Specifically, this data reinforced the suggestion by the program implementer and the interns surveyed that the Green Campus Program could benefit from additional publicity.





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GREEN CAMPUS REPORTING AND PERFORMANCE INDICATORS

A key objective of the Green Campus evaluation was to assist the program in moving toward the establishment of performance indicators for monthly status reporting. Edison is seeking monthly status reporting that will provide indicators of program effectiveness and continuous improvement. Interviews with both Edison and program implementation staff found general dissatisfaction with current reporting, as it is time-consuming to produce and read and does not readily support tracking program achievements over time or across campuses.

CURRENT STATUS REPORTING

The Green Campus program implementer provides Edison with a “monthly report narrative.” The evaluation team analyzed three of these reports – those for February, March, and April 2008 – to form an understanding of the monthly narrative report’s typical content.

Status Report Format

The three reports (February, March, April) comprised between seven and twelve pages each, and appended to each were between 9 and 17 attachments providing supporting documents.

1. Program Description
 - This section begins with a short description of the program that repeats each month.
2. Administrative Activities
 - This section begins with a short description of the campus leads’ work that largely repeats each month, with only the names of the universities the leads visited changing. In addition, the section may mention new hires.
 - The section subsequently describes the activities that program implementation staff carried out during the month to support and promote the program as a whole. This description changes from month to month.
3. Marketing Activities
 - This section begins with a mention of the newsletters Green Campus interns produce and gives an explanation when interns did not produce a newsletter due to their university’s academic calendar.
 - The section subsequently discusses any exposure that the Green Campus Program as a whole received through conferences, media coverage, or any other channels.



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This section largely deals with the work of program implementation staff and changes each month.

- Each university receives a subheading, under which details of any efforts to raise awareness of energy efficiency or the Green Campus organization on that campus appear.

4. Direct Implementation Activities

- If applicable, this section begins with an explanation of any limitations to implementation activities due to each university's academic calendar.
- In each case, this section directs readers to an attachment for details of the interns' implementation budget.
- Each newsletter includes details of CFL exchanges, including year-to-date CFL exchange totals and monthly totals broken down by the provider of the CFLs and the utility in whose coverage territory the CFLs were distributed.
- Each university receives a subheading describing the direct energy-saving activities of its Green Campus interns, including CFL exchanges, office audits, and energy competitions.

5. Program Performance / Program Status

- This section includes a check box to indicate whether the program is on target, exceeding expectations, or falling short of expectations. Exceeding expectations had been selected in each of the reports that the evaluators reviewed.
- The report includes a brief explanation in support of the status box checked, this explanation did not change between the reports the evaluators reviewed.

6. Program Achievements (for non-resource programs only)

- This section lists progress toward any of the eight program tasks, which are presumably laid out in the program implementer's contract. Within the reporting on these tasks, each university involved in the task receives a subheading. Only tasks on which there was activity during the reporting period are included in the report.
- There was some confusion in the numbering of the tasks across the status reports (confusion regarding the labeling of Tasks 1 and 2, and of Tasks 6 and 7).

7. Change in Program Emphasis, if any

- Typical response: "None."



8. Changes to Staffing and Staff Responsibilities, if any
 - This section gives details of any interns leaving the program and of any newly hired interns.
9. Changes to Contractors and Contractor Responsibilities, if any
 - Typical response: “No changes at this time.”
10. Attachments

→ **Implication: Information about projects carried out at each university may appear in one of three separate places in each report, and the report format appears to offer little opportunity to assess the performance of the program overall.**

PERFORMANCE INDICATORS

A comprehensive review of program activities, outputs, and outcomes for the 2009-2011 program cycle conducted by the evaluation team suggests the following indicators for program activities, outputs, and outcomes for review and consideration by the program management team and program implementation staff. As discussed in the *Status Report Format* subsection above and in the *Current Monitoring and Reporting* subsection in Chapter 15, the program implementer currently reports on some of these indicators. Other indicators may require additional communication between Edison and the program implementer. This list is intended to serve as a reference for Edison and the program implementer as they refine program reporting structures and develop key performance indicators. Asterisks at the end of items indicate the implementer currently includes the item in its status reports.

Potential outcome performance indicators include, but are not limited to:

- Number of active faculty stakeholders
- Number of active university administrator stakeholders (executives or their representatives)
- Number of active facility management staff
- Number of active housing directors, dining hall directors/managers, or comparable roles
- Number of campuses with ongoing student involvement beyond that of interns (example: Green Campus club or environmental club in which Green Campus interns play a prominent role)
- Processes improved
- Resources and website improved



- ➔ Number of intern presentations to convergences and other groups*
- ➔ Number of interns attending convergences*
- ➔ Number of stakeholders attending convergences*
- ➔ Number of energy-saving campaigns designed for current academic year
- ➔ Number of energy-saving campaigns implemented
- ➔ Number of energy-saving campaigns with completed energy savings measurements
- ➔ Number of awareness campaigns designed for current academic year
- ➔ Number of awareness campaigns implemented
- ➔ Estimated number of students touched by awareness campaigns*
- ➔ Estimated number of faculty touched by awareness campaigns
- ➔ Estimated number of staff touched by awareness campaigns
- ➔ Number of inquiries about other Edison programs from Green Campus*
- ➔ Number of times Green Campuses participate in other Edison programs*
- ➔ Intern self-assessment: agree efficiency-related knowledge and skills have increased, rating a “4” or “5” on a five-point agreement scale
- ➔ Student self-assessment: agree efficiency-related knowledge has increased, rating a “4” or “5” on a five-point agreement scale (from intercept survey of students involved in awareness or direct action activities)
- ➔ Intern and student self-assessment: agree Green Campus Program has piqued or supported their interest in “green career” choices, rating a “4” or “5” on a five-point agreement scale
- ➔ kWh savings*
- ➔ Number of energy savings recommendations made to campus management
- ➔ Number of newsletters*



18 GREEN CAMPUS CONCLUSIONS AND RECOMMENDATIONS

The assessment of the Green Campus Program addresses the following evaluation objectives:

1. Identifying success factors and other factors influencing the performance of Green Campus universities, including current approaches to identifying and disseminating best practices across universities.
2. Explore the opportunity to add performance measures to the Green Campus Program.

As stated, this investigation was not intended to be a comprehensive evaluation of the statewide Green Campus Program. The evaluation objectives focused on a narrow set of issues; its purview is the four participating universities within Edison's service territory, and data collection was limited to interns and program staff. The evaluation focuses on the experiences of and interactions between Green Campus interns, the program implementer, and Edison staff in order to shed light on success factors and identify potential performance indicators.

The evaluation team summarizes the findings and draws conclusions relating to each objective, starting with findings relating to the program as a whole. Recommendations follow the conclusions.

In addition to the recommendations in this chapter, the prior chapters explicitly note opportunities to enhance the program and its administration.

OVERALL ASSESSMENT OF THE GREEN CAMPUS PROGRAM

Summary of Findings

Green Campus interns expressed a great deal of satisfaction with their experiences in the program. Both the intern survey and interviews with the program implementer demonstrated that campus leads provide the interns with a great deal of information and support, which the interns value. The program also provides interns with a variety of professional development resources, ranging from formal career advice and networking sessions to the practical experience that interns gain as they carry out projects to promote energy efficiency on their campuses.

The goals interns set for the Green Campus Program at their universities and the projects they carried out were largely consistent with the overall goals set by the program implementer. Survey results showed that interns gave the greatest importance to projects directed at students, whether these projects were designed to raise awareness or achieve direct energy savings. In addition, the majority of the goals interns expressed for their campuses and the majority of the projects they carried out sought to influence the behavior of students.



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During the 2006-2008 program cycle, the Green Campus Program took significant steps to improve its reporting processes. Working with Edison's program manager, the program implementer began reporting energy savings and other metrics in ways that better allow for tracking program performance over time on each campus, and that are more conducive to measuring the impact of the program as a whole.

As the Green Campus program has transitioned to be a non-resource program under the Statewide Workforce Education and Training Program, the program implementer has taken steps to increase the program's focus on education and professional development.

Conclusions

The Green Campus Program appears to be making effective use of student interns. Green Campus interns appear highly involved in the program and enthusiastic about its objectives. Interns conduct numerous projects each year geared toward increasing awareness of energy efficiency opportunities among students, faculty, staff, and administrators, and in acquiring energy savings through direct action.

Through campus leads, the program implementer has been able to provide interns with the guidance and support that they need to carry out their projects. The close relationship between campus leads and interns also allows the program implementer to monitor intern performance and ensure that intern teams are making progress toward their goals.

The program implementer appears to have been responsive to the recommendations of the prior program evaluation and to Edison's advice. During much of the 2006-2008 program cycle, the implementer worked to build intern training, as well as measurement and reporting procedures in support of the program's focus on achieving measurable energy savings.

Overall, the Green Campus Program is well positioned to build awareness of energy efficiency and achieve direct energy savings at the universities where it operates, while at the same time contributing to the preparation of interns and other students for careers in energy efficiency-related fields. As the program moves forward and pursues continuous improvement, this evaluation has identified a variety of areas in which the program could further strengthen its offerings. These opportunities are discussed below and address many of the concerns identified in the interview and survey findings.

FACTORS INFLUENCING CAMPUS PERFORMANCE

Summary of Findings

Three factors stood out in terms of their influence on the success of the Green Campus Program: campus leads, intern teams, and stakeholders.



The program implementer recognizes the value of in-person interaction with intern teams and the personalized support provided to interns, and survey results suggest that interns appreciate this support and would like to receive more of it. Currently, five campus leads provide support to 13 campuses.

Because strong intern teams are necessary for program success, the program needs to maintain continuity and stability within the Green Campus intern team at each university. The program faces turnover among student interns as a result of the ordinary conditions of student life. Like other students, interns graduate, transfer to other universities, and need to adjust their extracurricular activities to changing academic workloads. As a result, the program faces an ongoing need to train new interns and help them build relationships with campus stakeholders.

The third factor having a key influence on the performance of the Green Campus Program is the level of stakeholder engagement that the program is able to achieve on each campus. Because neither the student interns nor the implementation contractor staff have the authority to make changes in university facilities or procedures, campus stakeholders ultimately determine whether to implement Green Campus recommendations.

Beyond their role as a gatekeeper in terms of campus decision-making, stakeholder networks also play a role in ensuring the stability and continuity of the Green Campus Program. Faculty and staff stakeholders who are closely involved with the Green Campus Program can take a long-term view of the program's work and use their knowledge and the program's experience to advise new interns.

In addition to faculty and staff stakeholders, student stakeholders in the form of Green Campus volunteers and other student-led environmental groups can play a significant role in helping the Green Campus Program meet its objectives. Survey data showed that interns gave a great deal of importance to building relationships with student stakeholders. By gaining support among student stakeholders, interns extend the reach of Green Campus into the campus community, as well as contribute to the stability of the program through the development of a pool of qualified individuals to fill Green Campus intern positions.

The program implementer eschews a one-size-fits-all format for Green Campus and works individually with each intern team. Yet the program implementer also recognizes the challenges in getting the intern team at each campus up-to-speed and recognizes how student turn-over undermines intern team effectiveness.

When asked whether there was anything the Green Campus Program could do to be more successful, suggestions from the interns included more training, better communication with Green Campus staff, as well as students, and more support on more projects. Facility managers at participating campuses offered similar suggestions, specifically: more initial guidance, better communication, and additional tools to quantify efforts.

In other findings, the survey of interns suggested that full intern teams rarely collaborated on Green Campus initiatives, likely as a result of the time constraints that interns face and the large



number of projects they sought to carry out. Interns identified lack of time as a barrier to achieving program goals.

Conclusions

The Green Campus Program works through relationships: relationships between and among the campus leads, the intern teams, and the campus stakeholders. However, campus leads can serve only a limited number of campuses (about three on average) while providing the intensive support intern teams need to be successful.

Most of the recommendations offered by interns and facility managers appear to necessitate increased staff time on the part of the program implementer: better training, better communication, increased project support. While the evaluation did not find any evidence of poor performance on the part of campus leads, in order for the program to continue to improve along the lines suggested by survey respondents – or for the program to grow in scope – the program implementer will likely need to increase staff or will need to more effectively leverage its staff resources. Solutions that more effectively leverage campus lead resources have the added potential advantage of making better use of intern time, thus reducing one of the barriers interns perceive – lack of time.

Recommendations

The program implementer is strongly encouraged to develop program processes that will enable intern teams to increase their effectiveness without a commensurate increase in time spent with the team by the campus lead.

As one potential approach to increasing team effectiveness, the program implementer should consider encouraging all teams to adopt the division of labor implemented by the Green Campus intern team at CSU Humboldt, as described in chapter 14. With its current establishment of administrative roles (like team managers, treasurers, and secretaries) for interns to take on, the program implementer is able to provide specialized training only to those interns for whom it would be relevant. However, by broadening these specializations to include the outreach, project implementation, and measurement activities that make up the bulk of an intern team's work, the implementer could further streamline intern training and reduce the negative impacts of intern turnover.

While all interns should have a basic understanding of a range of energy efficiency topics, defining roles for interns to take on that go beyond their administrative duties would allow the program implementer to provide in-depth training on communication strategies only to those interns who have taken on publicity roles, for example, while providing detailed training on measuring energy savings only to interns who will play that role on the intern team. In addition, defining roles in this way offers the potential to ease the transitions that result from intern turnover, as work within the intern team would not be divided in terms only of the interests and



abilities of team members, and would therefore not need to be renegotiated when the makeup of the intern team changes.

Additional specific recommendations for increasing intern team effectiveness are included in the next section.

Further, the Edison EARTH Schools program manager and the program implementer should collaborate to determine if funding sources can be obtained to provide each campus with equipment that the intern team and campus facility staff could use to track energy use and measure the effects of energy conservation efforts. By more closely tracking energy savings accomplishments, the Green Campus Program could better demonstrate its benefit to campus stakeholders. The program implementer and the Edison program manager should develop a plan specifying what type of equipment the intern teams need, where the equipment would be installed or used, and how the equipment would be used.

DISSEMINATION OF BEST PRACTICES

Summary of Findings

The Green Campus Program has a variety of methods in place to identify and disseminate best practices. First, through regular contact with interns and meetings as part of the direct implementation team, campus leads are able to compare the experiences of interns across the universities participating in the Green Campus Program. The campus leads can then share information from one campus with interns at other Green Campus universities for whom the information might be relevant.

The two convergences that the program implementer hosts each year provide another opportunity to disseminate best practices to intern teams at each of the participating universities. Interns are invited to make presentations sharing the projects that they carried out and any learning about best practices that came out of their experience. In addition, the convergences offer interns a chance to network and compare experiences across campuses.

In an effort to better serve interns across multiple campuses, the program implementer has begun to develop a set of core portfolio projects that campus leads propose to the intern team on each campus. During the 2007-2008 academic year, the program implementer began this effort with a fume hood energy competition, and the implementer has since expanded its core portfolio to include eight projects, as well as best practices related to conducting energy audits and integrating energy efficiency into the academic curriculum.

The program implementer also maintains a website that seeks to provide an opportunity for interns and the program implementer to share information and best practices. This website contains a very large amount of information; the program implementer provides interns with training on how to use and navigate the site, which one implementation staff member referred to as “unwieldy.” The program implementer’s outline of the folders contained on the *Green*



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Campus ProjectSpaces website spans, when printed, 20 hard-copy pages. A scan of just 20 website pages identified roughly 200 to 300 documents posted between September and November 2008 alone.

While the interns surveyed stated that the *ProjectSpaces* website largely meets their expectations, it is unclear to what extent the site serves as a tool for facilitating communication between interns across campuses. A limited review of the website suggests that the *ProjectSpaces* site is primarily designed to allow information sharing between interns and program staff, and to provide intern teams with a way to organize information internally. The program implementer has brought together resources from a variety of campuses on the site's pages focused on core portfolio projects. However, it would likely be more difficult for interns to locate information on projects outside of the core portfolio or to identify additional materials that their peers had created related to core portfolio projects. In addition, the site's discussion section appeared under-utilized, with only eight topics posted going back to August 2006, and no more than two responses to any topic.

Conclusions

The program relies primarily on two broad types of approaches to disseminating best practices: in-person dissemination through the guidance of campus leads and information-sharing at convergences; and web-based dissemination. The interns are generally unsuccessful in initiating intern-to-intern communication.

The implementer is just embarking on a third approach: core portfolio projects. This approach brings some standardization across participating campuses.

Increased standardization of activities and methods across participating Green Campus campuses will make it easier and faster for interns to come up to speed, increasing their effectiveness and thus the effectiveness of the campus leads. Increased standardization also enhances training, as training can be focused on recommended approaches, rather than necessitating a wide net in order to prepare interns for many options. Standardization enhances communication by providing both themes for communication and lessons learned over time regarding key communication elements and strategies. Finally, increased standardization can result in interactions with facility managers that better meet their concerns – as expressed in the surveys – for more guidance, better communication, and access to tools to quantify energy savings. Increased standardization does not require “one-size-fits-all,” but rather requires greater structure to the Green Campus resources.

The large amount of information that the *ProjectSpaces* website provides has the potential to be a valuable resource for Green Campus interns. However, for the website to meet its potential, the information must be organized in a way that supports the site's overall goals and facilitates interns' access to resources. While the scope of this evaluation does not allow the evaluators to draw conclusions as to the overall effectiveness of the *ProjectSpaces* website, it is important to recognize that, with such a large amount of information presented, an ineffective site could have



significant negative consequences for the program. The time and effort that interns must spend accessing resources on the *ProjectSpaces* website cuts into the time available for planning and implementation. In addition, inaccessible information can generate frustration and undermine enthusiasm.

Recommendations

Subsequent to the period reviewed by this evaluation, the program implementer has expanded its core portfolio projects to include eight projects for the intern teams to consider. The evaluators believe that this expanded core portfolio will serve as a valuable tool for disseminating best practices and streamlining program activities.

Each project should be elaborated in terms of its design, implementation, and measurement processes so that each intern team need only make adaptations to a well-thought-out idea and not need to reinvent the project at each campus. In addition, the program implementer should continue to monitor intern activities to identify new projects to add to the core portfolio and to remove projects from the core portfolio when they are no longer relevant.

The program implementer should also identify and disseminate a list of best practices in addition to the portfolio projects. Such practices might include effective energy efficiency messages for students and for different groups among campus staff (e.g., faculty, facility managers); approaches to developing a Green Campus club or collaborating with other established environmental clubs in a manner that showcases Green Campus goals and activities; and effective ways to motivate students to take part in the core portfolio projects (e.g., a raffle to win an iPod).

To further increase the efficient use of the program's resources, rather than encouraging intern teams to take on such a broad range of initiatives, the program implementer should direct intern teams to focus on addressing the program's goals through a smaller number of projects on which all or most of the intern team collaborates. By focusing on fewer projects, intern teams will be able to apply their resources more efficiently; and by placing a greater focus on collaboration, the time constraints of individual interns may place less of a limitation on the overall success of each initiative.

Finally, the program implementer is urged to evaluate the *ProjectSpaces* website to ensure that it is an effective tool for disseminating Green Campus information. The website would be improved by focusing on core portfolio projects and best practices relating to the topics discussed above. As part of this effort, the program implementer should consider consulting with a website usability expert to obtain advice on improving the design of the site to make it more user-friendly. If this is not feasible, the program implementer should ensure that the website



meets best practice user design principles.⁷² In addition, the program could benefit from the use of a web analytics software program to examine the end-user experience and provide feedback to support continuous process improvement in site maintenance.⁷³

FACTORS INFLUENCING THE CAMPUS ENVIRONMENT

Findings

The interviews and survey data included in this evaluation identify two key areas that influence the environment in which the Green Campus Program operates on each campus. One, there appears to be a great deal of variability in the level of commitment to sustainability among high-level university administrators and in the administrative structures related to sustainability that exist at each university (see Appendix F). Two, the makeup of the student population seems to have a significant impact on the ability of Green Campus interns to carry out projects and to form student groups in support of the program's goals.

Conclusions

Green campus interns are uniquely positioned to carry out projects to promote energy efficiency among students. As students themselves, they have a better understanding of student audiences than any outside group would and, as part of the campus community, interns can easily reach out to their fellow students through events and publicity. However, the makeup of the student population will significantly influence the ways that Green Campus interns relate to the larger campus community and the types of projects they are able to carry out.

Green Campus interns will be far better able to build volunteer clubs and draw large numbers of students to events at universities where a large proportion of the student population lives on or near campus than they will be able to do so at campuses where a smaller proportion of students are residents. Students who commute to campus will likely be less willing to take part in extracurricular activities or events. However interns on campuses with a large proportion of commuters can achieve program goals by focusing on information and outreach campaigns, and making Green Campus a visible part of existing events that would draw students to the campus.⁷⁴

⁷² Chapter 1 of this report presents a series of factors to consider when evaluating website design. Chapters 5 and 11 of this report demonstrate these factors as applied in evaluations of websites supporting the Green Schools and LivingWise® programs.

⁷³ There are several inexpensive web analytics software packages available that require relatively little technical knowledge to use. One example is *Google Analytics*.

⁷⁴ In their responses to open-ended questions asked as part of the intern survey detailed in Chapter 16, interns at two of the four campuses within Edison's service territory, CSU San Bernardino and Cal Poly Pomona, identified the student body of their university as largely made up of commuters. Statistics provided by the Princeton Review support these findings. At Cal Poly Pomona, only 9% of the total student body lives on

continued...



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While the proportion of students that commute influences the way Green Campus interns relate to students, the level of commitment to sustainability among the university's high level administration influences the relationship between intern teams and campus stakeholders. In all cases, intern teams must work with stakeholders and seek to gain their support where possible; however, intern teams are unlikely to foster a significant ideological shift in campus administrators. When administration support for sustainability is low, even the strongest relationships between interns and campus stakeholders will likely gain little more than the operational support the interns need to carry out their projects and events. In these cases, Green Campus resources would be better focused on areas where the intern team can have a direct impact, like influencing student behaviors, rather than efforts to convince unwilling campus administrators to alter facility operations.

However, where there is a high level of commitment to sustainability, intern teams have an opportunity to demonstrate the program's value to campus stakeholders by supporting existing sustainability efforts. Interns could play a valuable role in helping to implement larger sustainability efforts among students, and a strong administrative commitment to sustainability may also open up opportunities for projects directed toward faculty or administrators. Linkages between the Green Campus Program and University of California and California State University sustainability offices and officers could facilitate these efforts. Harvard's Resource Efficiency Program, the student counterpart to the university-wide Harvard Sustainability Program (discussed in Appendix F), offers an example of a student-led energy efficiency program in an environment with a high level of administrative support for sustainability.

Figure 18.1: Adapting Intern Activities to Reflect Levels of Commitment to Sustainability Among Administrators and the Proportion of Students Who Commute Figure 18.1 demonstrates the types of activities that interns might carry out in response to the level of administrative commitment to sustainability at their university and the proportion of students who commute.

campus and at UC San Bernardino 10% lives on campus. In contrast, at UC Santa Barbara and UC Irvine, 33% and 36% respectively of the student body lives on campus.



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Figure 18.1: Adapting Intern Activities to Reflect Levels of Commitment to Sustainability Among Administrators and the Proportion of Students Who Commute



Recommendations

Because both the proportion of students who commute and the level of commitment to sustainability among high level administrators have such a significant impact on the environment in which the Green Campus Program operates at each campus, the program implementer should



consider developing a structured approach to account for these differences. Rather than trying to alter the environment in which they operate – as these dimensions of institutional commitment and student residency are outside the influence of interns – the program implementer should help intern teams effectively adapt to their environments. To this end, the program implementer has designed the program to be flexible enough to adapt to the unique campus environments in which it operates.

However, the program implementer's efforts to streamline processes for intern training and dissemination of best practices offer a further opportunity to address differences in the makeup of the campus community and administration attitudes in a systematic way. For example, the program implementer's core portfolio could include projects most appropriate for each of the four types of environments (see Figure 18.1) or suggestions of ways that intern teams could adapt each project to reflect their campus environment.

AMPLIFYING THE EFFECTIVENESS OF GREEN CAMPUS

Summary of Findings

Despite the many projects directed at students, the interns surveyed reported they found it difficult to achieve a significant shift in attitudes or behavior change among students. While the interns reported that administrators and building operations staff members were more open to Green Campus ideas and willing to participate in events, the interns found that these groups were also reluctant to commit to meaningful behavior change. Interns are unable to establish peer relationships with campus staff, as they are not adults, have not completed comparable education as staff, and are in a subordinate institutional role.

Campus facility managers participating in the UC/CSU/IOU Partnership Program, which provides retrocommissioning services, appear to have been particularly receptive to Green Campus goals and intern activities, although the current research has limited findings on this issue.

Conclusions

The Green Campus interns are charged with working with campus staff (including administrators) to seize energy savings opportunities. As students, interns may have greater access to campus staff than outside actors, and the process evaluation findings suggest that interns are collaborating with campus staff. However, the very nature of the internship position may limit the extent to which interns can effectively collaborate with campus administrators, since interns are in a subordinate institutional position and lack the educational and professional status of campus administrators. Edison's additional efficiency efforts have the potential to reach out to campus staff in ways that Green Campus interns cannot.



Recommendations

Edison has the opportunity to leverage Green Campus activities by targeting participating campuses in its account representative services, its energy efficiency programs, and at an executive level.

Additional opportunities remain for Edison account representatives to work closely with university administrative and facilities management staffs to answer their questions, provide them with resources, and link them to Edison's energy efficiency incentives. There also are opportunities for the Edison EARTH Schools program manager, Edison's commercial program manager, and Edison executives to meet briefly with university executives in a peer-to-peer conversation to convey to the university executives Edison's strong support for an ongoing, collaborative relationship. The program implementer also values the ongoing collaboration between the Green Campus Program and the UC/CSU/IOU Energy Efficiency Partnership program, and there may be an opportunity for Edison to play a role in support of this collaboration.

Increased standardization of Green Campus activities across campuses will also facilitate Edison's leveraging of the program. Account representatives, incentive program managers, the EARTH Schools manager, and more senior-level Edison staff can more effectively engage university managers and executives in a dialogue and partnership if these Edison staff have an understanding of the slate of activities Green Campus uniformly promotes to its intern teams.

POSSIBLE KEY PERFORMANCE INDICATORS

Summary of Findings

Green Campus interns are required to formally evaluate each of the projects they carry out within two weeks of completion. The interns report the results of these evaluations in the monthly newsletters that they distribute to campus stakeholders and share the information with campus leads. Interns receive training in evaluating their projects at the program's biannual convergences, but some interns may require additional training to fully track the intern team's work. For example, the member of the intern team with the most technical understanding may receive instruction on gathering the baseline data necessary to evaluate residence hall energy competitions, but not all interns receive this training.

During the 2006-2008 program cycle, the Green Campus Program largely measured its performance in terms of energy savings resulting from intern-led programs. Interns reported energy savings resulting from competitions between residence halls, campaigns to reduce energy use by laboratory fume hoods, and savings from replacing incandescent lights with CFLs. In addition, the program implementer compiles lists of the outreach and education efforts, and the public relations and marketing campaigns that Green Campus interns conduct, including estimates of the number of people each initiative reached.



The program implementer detailed a variety of areas in which it plans to improve performance measures as the Green Campus Program moves forward. In terms of measuring direct energy savings, the program implementer hopes to create a running tally of the energy saved as a result of Green Campus efforts. The implementer also plans to establish a competition between interns at each Green Campus university to save the most energy. In addition to these measures of direct energy savings, the program implementer plans to encourage interns to increase their use of surveys to measure the impact of their programs on attitudes and behavior change.

Intern teams produce monthly newsletters that document their activities in order to inform their stakeholders and the program implementer.

The program implementer produces monthly status reports for Green Campus. The structure of these status reports is a legacy from past years and does not facilitate a clear statement of achievements nor facilitate comparisons across campuses or the development of a summary assessment of the program overall.

The program appears to have continuous improvement processes in place, yet the current reporting format does not effectively communicate the outcome of these processes to the EARTH Schools program manager.

Conclusions

Program tracking and measurement methods appear to have been strengthened since the last evaluation of Green Campus, consistent with the evaluation recommendation, although the current study was not able to conduct a rigorous comparison of past and current practices.

Despite the improvements made since the previous evaluation, neither Edison nor the program implementer is satisfied with the current program status reporting format.

Recommendations

The Edison program manager and the implementation contractor should work together to revise the program status reporting to better describe program activities, outputs and outcomes, and steps undertaken toward continuous improvement.

While the reporting format needs to be able to adequately capture the diversity of activities, outputs, and outcomes across the campuses, there is also value in a reporting format that facilitates comparisons across campuses. Such comparisons will contribute to Edison's understanding of program achievements overall – rather than as a sum of desperate elements – and support an analysis and understanding of how campus characteristics influence campus outcomes.

Per Edison's request, the following key performance indicators, which tie directly to program logic and goals, are provided for consideration as possible reporting metrics to be included in



status reporting. As a sketch of performance indicators for Edison and the program implementer to consider, the following includes metrics that the program implementer already tracks, as well as suggestions for additional metrics.

Table 18.1 gives a sketch of what a table of performance indicators might look like.

Table 18.1: Sketch of Possible Green Campus Performance Indicator Report

PERFORMANCE INDICATOR	CUMULATIVE-TO-DATE FROM SEPTEMBER 1, 2009 THROUGH:			
	9/30/09	10/31/09	11/30/09	12/31/09
DESIGN AND IMPLEMENT STUDENT-LED CAMPAIGNS TO ATTAIN MEASURABLE ENERGY SAVINGS				
Number of energy-saving campaigns designed for current academic year (across all campuses)				
Number of energy-saving campaigns implemented				
Number of energy-saving campaigns with completed energy savings measurements				
Number of energy savings recommendations made to campus management				
kWh savings				
CREATE PARTNERSHIPS AMONG STUDENTS, FACULTY, AND STAFF				
Number of campuses with ongoing student involvement beyond that of interns (for example, Green Campus club or environmental club in which Green Campus interns play a prominent role)				
Number of active faculty stakeholders (across all campuses)				
Number of active university administrator stakeholders (executives or their representatives; all campuses)				
Number of active facility management staff (all campuses)				
Number of active housing directors, dining hall directors, or comparable roles (all campuses)				
Number of contacts with stakeholders during period				
				Continued



PERFORMANCE INDICATOR	CUMULATIVE-TO-DATE FROM SEPTEMBER 1, 2009 THROUGH:			
	9/30/09	10/31/09	11/30/09	12/31/09
RAISE CAMPUS AWARENESS ABOUT RELATIONSHIP BETWEEN ENERGY AND THE ENVIRONMENT (NOTE: THE TALLY WOULD NOT INCLUDE ANY ENERGY SAVINGS CAMPAIGNS UNLESS THOSE CAMPAIGNS HAD A SIGNIFICANT AWARENESS/EDUCATIONAL COMPONENT ADDRESSING ENVIRONMENTAL BENEFITS OF SAVING ENERGY)				
Number of awareness campaigns designed for current academic year				
Number of awareness campaigns implemented				
Estimated number of students touched by awareness campaigns				
Student self-assessment: agree efficiency-related knowledge has increased (from intercept survey)				
Student self-assessment: agree Green Campus Program has piqued or supported their interest in "green career" choices				
Estimated number of faculty touched by awareness campaigns				
Estimated number of staff touched by awareness campaigns				
PROVIDE TRAINING, MENTORING, AND ENCOURAGEMENT TO FUTURE ENERGY EFFICIENCY PROFESSIONALS				
Number of interns receiving formal training [per previously established definition of "formal training"]				
Intern self-assessment: agree efficiency-related knowledge and skills have increased (from survey)				
Intern self-assessment: agree Green Campus Program has piqued or supported their interest in "green career" choices				
Number of intern presentations to convergences and other groups				
Number of interns attending convergences				
Number of stakeholders attending convergences				
LINK WITH OTHER EDISON PROGRAMS				
Number of inquiries about other Edison programs from Green Campus				
Number of times Green Campuses participate in other Edison programs				
				Continued



PERFORMANCE INDICATOR	CUMULATIVE-TO-DATE FROM SEPTEMBER 1, 2009 THROUGH:			
	9/30/09	10/31/09	11/30/09	12/31/09
PROGRAM CONTINUOUS IMPROVEMENT				
Program process improvement [per previously established definition of improvement]				
Program website improvement [per previously established definition of improvement]				

RECOMMENDATIONS FOR FUTURE RESEARCH

The Green Campus Program could benefit from the following research in a future process evaluation:

- ➔ Investigate perceptions of Green Campus among the stakeholder advisory committee members, as well as their assessments of barriers to success and recommendations for improvement.
- ➔ Investigate interns' familiarity with the stakeholder advisory group, and assess more fully the nature of the relationship interns have with campus stakeholders.
- ➔ Investigate the extent to which interns have been able to achieve meaningful measures of the results of their events and activities, and the extent to which these measures inform future program planning, both at the same university and on other campuses.
- ➔ Investigate which aspects of the training interns receive and the work they carry out are potentially most applicable to future careers in energy efficiency, and how many interns are actively preparing for or considering pursuing careers in energy efficiency.
- ➔ Investigate the extent to which the Green Campus Program has created ties with other Edison programs and how those ties were created, including whether interns consider these ties in their activity planning process.





APPENDICES

- APPENDIX A: 2006-2008 GREEN SCHOOLS PROGRAM THEORY AND LOGIC**
- APPENDIX B: ALLIANCE TO SAVE ENERGY & GREEN SCHOOLS WEBSITE**
- APPENDIX C: 2006-2008 LIVINGWISE[®] PROGRAM THEORY AND LOGIC – 11/15/07**
- APPENDIX D: GETWISE, GETLIVINGWISE, AND RAP WEBSITES**
- APPENDIX E: GREEN CAMPUS PROGRAM THEORY AND LOGIC – 11/14/07**
- APPENDIX F: UNIVERSITY COMMITMENTS TO SUSTAINABILITY**
- APPENDIX G: GREEN CAMPUS INTERN GOALS AND ACTIVITIES**
- APPENDIX H: GREEN SCHOOLS SURVEY INSTRUMENTS**
- APPENDIX I: LIVINGWISE[®] SURVEY INSTRUMENTS**
- APPENDIX J: GREEN CAMPUS SURVEY INSTRUMENTS**



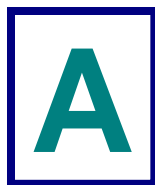
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GREEN CAMPUS CONCLUSIONS AND RECOMMENDATIONS



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PROCESS EVALUATION OF THE 2006-2008 EARTH EDUCATION & TRAINING PROGRAM



2006-2008 GREEN SCHOOLS PROGRAM THEORY AND LOGIC

This appendix provides a document prepared by Edison staff, entitled *Green Schools Program Theory and Logic Model, Integrated Schools Program, Southern California Edison*, dated November 7, 2007.

INTRODUCTION

Energy costs for schools can be an enormous expense. They are the second-largest expense for schools after employee salaries. It is estimated that schools could save about 25% of these costs by improving energy efficiency, according to the US Department of Energy. However, significant market barriers continue to persist, including declining school budgets and lack of experience with energy efficiency technologies, which has caused schools to lag behind in their efforts to adopt cost efficient energy solutions. The Green Schools Program is designed to help California schools overcome these barriers through teaching and hands on activities. This educational program will help to create a new generation of energy smart citizens that contribute towards energy savings for their schools, homes, and the broader community through a hands-on teaching curriculum that fosters a deeper understanding of the relationship between energy use and its impact on the environment.

The following document describes the program, identifies market barriers, indicates goals, explains strategies, and shows how success will be measured to serve as a guide for future process and impact evaluations or market assessments. Southern California Edison (SCE) recognizes that this logic model and program theory might change as new elements are added to the design and delivery of the Green Schools Program.

MOTIVATION

This assessment, which includes the enclosed program theory and logic model, was conducted in order to codify the program for the current 2006-2008 program cycle. The assessment starts off with a systematic description of the assumptions underlying the program which provided the rationale for the program design and delivery model. Next, the report identifies program activities and outcomes, and the causal linkages between the two in order to establish testable hypothesis which can be used in an evaluation study to determine if program activities are causing the desired outcomes for the program. This component of the report takes the form of a 'logic model' which graphically represents the relationships between the program's major components and their intended outcomes. The assessment does not include an analysis of program performance indicators for each linkage in the logic model and associated data sources, a task which will be developed independently by program evaluators which can be used in a process or impact evaluation.



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PROGRAM DESCRIPTION

Implemented by the Alliance to Save Energy (ASE), the Green Schools Program educates students about energy efficiency and the important role it plays in protecting the environment while helping schools save on energy costs. The program takes a comprehensive, long-term approach to achieving energy efficiency in California schools by bringing together the facilities, instructional and administrative staff, and students in a cooperative effort to encourage new attitudes and behaviors towards energy conservation. Built into the program are specific action steps that model new energy conservation behaviors which lead to measurable energy savings in California schools including energy audits among other conservation activities. The Green Schools approach extends its impact from learning at school to homes and the broader community by encouraging children to apply what they learn at school about the value of energy efficiency in addition to their increased awareness of energy savings opportunities and actions to achieve the widest possible energy savings impact. To facilitate the adoption of the program in California schools, the instructional resources provided to teachers for program implementation are correlated to California curriculum standards and in many cases are developed by California teachers who have previously participated in the program.

MARKET BARRIERS

Declines in school funding over the last 20 years have left little or no room in school budgets for incorporating high performance energy savings measures during major repairs or renovation of existing buildings. In addition, schools often do not have information about the benefits of energy efficiency and there is often little enthusiasm for adopting more efficient technologies since administrators are uncertain about their performance. Compounding these programs is a lack of practical experience schools have with incorporating efficient technologies in school facilities. Finally, classroom science curricula in most California schools have traditionally not given much attention to energy use, conservation, and efficiency.

The Green Schools Program will address the above market barriers faced by schools through a combination of student, teacher, custodian and school administrator education programs to increase their awareness and knowledge of true energy costs in their schools and energy conservation solutions that will help them make better choices as energy consumers. Educating teachers and students will create a new generation of Californians who understand the significance of energy in their lives and their role in its efficient use.

PROGRAM GOALS

The desired outcomes of the program are to improve the energy conservation performance of public education facilities. Program outcomes are achieved at the facility level by informing facility operators and administrators about the benefits of energy efficient behaviors and operation practices. At the curriculum level, the program achieves this goal by educating students about energy efficiency and its linkages to the environment, as well as how to apply



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what they learned from the program at home and in their communities to achieve energy conservation and energy cost savings.

The basis of the program theory is that increased awareness will result in increased levels of energy and water efficiency measure adoption efforts at schools, homes and the broader community. This is accomplished by involving student “energy ambassadors” in activities that identify energy waste as well as activities that demonstrate ways to achieve energy conservation. The performance basis for the program is comprised of educational outcomes that include knowledge gains and attitudinal changes with respect to energy and water efficiency, in addition to measurable energy savings impacts created through specific energy savings activities taken at school. The results of energy savings activities are measured and tracked throughout the school year providing feedback on progress to program participants.

PROGRAM STRATEGIES AND ACTIVITIES

Green Schools works on a district level to enroll schools in the program at a rate of 25 new schools per year. The Green Schools Program is implemented by school-based teams which include teachers, custodians, administrators, and students at each participating school. The Alliance to Save Energy provides program support to the school teams to carry out the program which includes an introductory workshop that helps the teams work together to create a customized program plan for teaching about energy, energy savings activities they can implement in their schools, including ways to achieve school-wide energy awareness, and steps to broaden the message to student’s families and their local community.

Additionally, the Alliance provides a baseline of energy use and energy tracking to schools, professional development to teachers, and training for students to conduct energy surveys of their schools and homes. To assist in these efforts, a Local Project Leader from the Alliance to Save Energy is assigned to make visits to each school every other month. Additional support is also provided by phone and email support on an ongoing basis. In addition the school teams across the districts come together three times a year for planning, sharing, and celebrating successes and to learn from their challenges.

The Green Schools’ instructional materials provided by the Alliance are correlated to the California Department of Education standards in math, science, and language arts to facilitate the adoption of the program into the regular academic curriculum, a key participation factor for teachers and schools. Subsequently, students learn about ways they can save energy and help the environment through energy conservation, which is a key factor in their motivation and interest in the program. Classrooms constitute an interactive research laboratory that provides factual information for parents, school administrators, and facilities personnel. Students are encouraged through the program to involve their families in energy lessons and energy efficiency practices so that they can take energy conservation steps together at home and at school.

Program implementation begins with the identification of school districts, recruiting school sites and providing school support. Each school completes a brief application describing their desire



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to participate and identifies a team of teachers, custodians, and administrators to champion the program at their school. A Statement of Intention (SOI) is developed in a non-legal format for each participating school district that elects to participate, outlining the roles and responsibilities of the school district and the program.

Additionally, the SOI encourages districts to return a percentage of savings back to the schools that achieve them.

In addition, program implementation includes the following specific activities:

- ➔ **Conduct one-day Professional Development Workshops for teams of teachers, custodians, administrators, and other participants from each school.** At the professional development workshop, program participants receive energy-related instructional resources and learn how to integrate hands-on, inquiry-based learning activities into their instruction. Each team works together to formulate a customized plan for how teachers will integrate energy into instruction, how teams will save energy at school, how the whole school will become involved in saving energy, and how the information will be taken home and into the community.

For the 2006 - 2008 program cycle, the following targets have been established:

- ➔ **Train and support teams of teachers, custodians, and administrators at 25 new schools per year, in addition to up to 25 second year schools.**
- ➔ **Establish baselines of electricity and gas usage for each participating school and provide monthly tracking reports to school teams.** The Alliance works with a subcontractor to determine historical baseline data as well as current energy data that are updated monthly and available for schools to access and consult at any time. Schools are also given adjusted energy savings data at the end of each school year as a benchmark.
- ➔ **Provide the following hands-on learning opportunities to interested school teams:**
 - **High school students will be trained to become student energy auditors through the program's Student Energy Audit Training program (SEAT).** These students will conduct energy surveys of their schools and when possible they will present their findings and recommendations to district administration and school boards. For the 2006-2008 program cycle, the following targets have been established:
 - **Provide energy audit training to 3 high schools per year.** Students are provided with opportunities to participate in energy patrols which identify and target energy savings opportunities on campus that can be taken at no cost by students.

Students are encouraged to identify ways to involve the whole school in saving energy, such as participating in energy patrols in their schools where they check



among other things that lights are off when not needed, thermostats are set appropriately, and checking to see that “vampire plugs” (power chords with transformers that extract energy even when the electronic source is not being used) are removed.

- **Provide Classroom Activities and Energy Lessons for Students.** Teachers will be provided with energy lessons that are age appropriate and correlated to the California State Standards for education curriculum. Additionally, some teachers will take an active part in developing new lessons to be used for this purpose. These lessons supplement traditional science, math, social studies, and language arts curriculum in California schools to improve students understanding of linkages between energy consumption and environmental conservation based on a cross disciplinary approach.
- **Provide information to teams on low-cost school retrofits.** The program will funnel information on incentives available through SCE’s energy efficiency, demand response, and renewable energy programs to schools through an SCE service representative assigned to each respective participating school district. For the 2006-2008 program cycle, the following targets have been established:
 - Exchange incandescent bulbs with compact fluorescent lamps in schools for a total of 12,000 bulbs over the three years of the program.
- **Conduct Mid-Year meetings of school teams and distribute stipends to successful participants.** The mid- year meeting brings teams together to discuss successes and challenges, network with other participating school teams in the area, and to plan activities for the second half of the school year. Green Teams, composed of up to three teachers, a custodian, and sometimes school administrators or students, are given a stipend for documented participation in the program.
- **Convene Advisory Council meetings bi-annually.** The program will continue to convene the California Green Schools Advisory Council, a group of leaders in the California energy and education fields that meets twice a year to discuss potential improvements to the California Green Schools program. Participants will include teachers, facility staff, and district level administrators that were active in the program, as well as environmental experts from other organizations. These meetings provide valuable guidance and insight into identifying ways to facilitate the continued integration of energy efficiency into the California educational structure and identifying opportunities to make the program more useful to California teachers and administrators.
- **Conduct end-of-year meeting/celebration of school teams.** The end-of-year meeting brings all Green Schools teams together to celebrate successes, recognize outstanding accomplishments, and plan summer activities.



RELATIONSHIP TO OTHER PROGRAMS AND ACTIVITIES

The Green Schools Program is conducted in conjunction with the Green Campus and Living Wise programs under Southern California Edison's "Integrated Schools Program" based on a comprehensive approach to integrate energy efficiency measures in California schools, homes, and communities to meet the goal of long-term energy savings and demand reduction.

PROGRAM LOGIC MODEL

Figure 1 [statement per the source document; in this report the figure is given as Figure 2.1] portrays the program theory in graphical representation to demonstrate how the activities, outputs, short and long term outcomes expected for the 2006-2008 Green Schools Program are causally related.

REFERENCES

- ➔ Southern California Edison *2007 Program Implementation Plan, California Integrated Schools Program*
- ➔ *2004-2005 Green Schools Evaluation*, Quantec, Ridge & Associates, et al.
- ➔ Alliance to Save Energy website



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ALLIANCE TO SAVE ENERGY & GREEN SCHOOLS WEBSITE

Descriptive Outline of Alliance to Save Energy Website Home: The left hand side of every page is organized with a Navigation Column which is directed at “Information For” the following audiences: **Consumers, Educators, Policy Makers, Alliance Associates, Media, Energy Professionals, Contributors**, and also includes **Events** and **e-EFFICIENCY NEWS**. The top of every page is also organized with a horizontal Navigation Bar which includes the following categories: **Home, Topics, Programs, Countries, News, Events, About Us, and Contact Us**. Each page also includes a location bar showing the pathway taken by the reader to access the current page (i.e., [Home>Programs>Green Schools>Green Schools In Action]). The following outline shows the Categories and levels of content available on the ASE Website starting with the left had Navigation Column and followed by the top of page Navigation Bar. Only the sections pertaining to Educators, Kids, and the Green Schools and Green Campus Programs have been fully detailed. Each Outline indentation indicates a deeper level of organization requiring the reader to click on a link to access the information.

LEFT COLUMN NAVIGATION FOR AUDIENCES (APPEARS ON EVERY PAGE)

1. **Consumers** [Home>Consumers]
 - 1.1. Tips to lower your energy bills
 - 1.2. Energy Efficiency Tax Credits
 - 1.3. Refinancing and remodeling
 - 1.4. Power\$mart
 - 1.5. Busting Energy Hogs
 - 1.6. Home Energy Check-up & Audit
 - 1.7. Multimedia Screening Room
 - 1.8. Energy Efficiency vs. Energy conservation
 - 1.9. Kids
2. **Educators:** [Home>Educators] Schools spend more on energy than on computers and textbooks combined. Reducing energy use is an effective way to help cash-strapped schools funnel more money into the classroom instead of the local utility. Just as important, the concept of energy efficiency provides multidisciplinary learning opportunities in math, science, and language arts. The Alliance to Save Energy offers educators a wide range of tools and resources to bring energy efficiency into the



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classroom to save energy while helping students build vital real-world skills. The Educators opening page links to KIDS, Green Schools Program, Green Campus Program, Students Leading the Way 2007-2008 and 2006-200, and School Operations and maintenance Best practices for Controlling Energy Costs

2.1. **Earth Apple Awards:** [Home>Educators>Earth Apple Awards] The Earth Apple Awards program is an annual, year-long competition for K-12 schools that involve students in saving energy in their school buildings. The Earth Apple Awards has been postponed until further notice. The last awards were given in 2003-2004.

2.2. Resources:

2.2.1. **Lesson Plans:** SEAT Background Materials [Home>News>Seat Background Materials>pdf>pdf] 48 slide Power Point presentation and trainer notes for the slides. New materials include these 48 slides plus 67 additional slides making the current 115 slide version.

2.2.2. **Newsletter:** March 2007 Update pdf

2.2.3. **Article:** Education Resource Organizations Directory (links to Ed.Gov website search engine - not an article)

2.2.4. **Case Study:** Projects That Work: Green Campus Best Practices [Home>News>Projects that Work Green Campus Best practices]

2.2.5. Video:

2.2.5.1. Howard County Film Festival [Home>News>HCFF>You Tube]

2.2.5.2. The Phantom Hunter Video [Home>News>PH>Google Video]

2.2.6. **Links:** The Arizona Daily Star. Schools Need Energy Efficiency. 7/5/2007 pdf

2.2.7. **Tips:** Not a Green Schools District? [Home>News>NaGSD]

2.2.8. **Regional Initiatives:** Students Leading the Way 2006-2007 [Home>News>SLW 2006-2007>pdf]

2.2.9. **Lesson Plans**[Home>Educators>Lesson Plans>uploaded files]

2.2.9.1. Things That Use Electricity

2.2.9.2. What Is Electrical Energy?

2.2.9.3. How Saving Energy Keeps the Earth a Cool Place to Live

2.2.10. **Article:** Students Leading the Way 2007-2008 pdf

2.2.11. **Lesson Plans**(UF)

2.2.11.1. Conservation for the Ages



- 2.2.11.2. Why Is It So Hot When I Sit Next to the Window?
- 2.2.11.3. Why Is It Hotter When I Wear Black In the Summer?
- 2.2.11.4. Energy Efficiency Ambassadors
- 2.2.12. **More Publications:** School Operations and Maintenance Best Practices for Controlling Energy Costs [Home>News>SOMBPCEC>Uploaded Files]
- 2.3. **Lesson Plans:** [Home>Educators>Lesson Plans] Download FREE Hands-on, Multidisciplinary Educator Lesson Plans. Teachers around the nation told us that they would like free, hands-on, multidisciplinary lesson plans in the hot area of energy. We have obtained rights for the lesson plans here for your classroom use. A number of them are used in the [Alliance to Save Energy's Green Schools Program](#)—a unique, collaborative effort by teachers, administrators, and facilities and maintenance staff which reduces school energy costs at the same time it educates students. Each of these plans can be downloaded as a PDF file and printed out. Click on the appropriate level below or in the left-hand navigation bar to get started.
 - 2.3.1. [Elementary School Lessons Plans](#) [Home>Educators>Lesson Plans>Elementary Lesson Plans] These lessons are suitable for grades K-5. Note: The Same Resources listed on the previous Earth Apple Page also appear here in the right hand column.
 - 2.3.1.1. [What is Electrical Energy?](#) By Amy Whitehead
Sundance Elementary School, Beaumont Unified School District. In this lesson students learn about electrical energy, and the difference between common items that use electricity, and those that do not. In understanding how and when energy is used, students gain awareness of ways to save energy
 - 2.3.1.2. [Things That Use Electricity](#) By Liz Henkels
Deer Canyon Elementary School, Alta Loma Unified School District. In this lesson students work together to identify items that use electricity, and the role they play in everyday life. Students conclude by illustrating these objects, while simultaneously practicing their pronunciation to build phonemic awareness.
 - 2.3.1.3. [Energy Hog Challenge](#) These activities and lessons challenge children to learn where energy comes from, how we use energy, and why it's important to save energy at home. Kids are empowered to take the lead at home in identifying Energy Hogs and to help their families save energy and money. Thoughtful activities best suited for grades 3-6 but can be adapted for older or younger students.



- 2.3.1.4. [Energy Jigsaw](#) Andrea Schindler Lee, Urbita Elementary School San Bernardino City Unified School District. Using a jigsaw learning design, students will research, discuss, and make presentations on energy sources such as solar, oil, coal, and wind.
- 2.3.1.5. [Green Team](#) Brad Harder, South Fortuna Elementary School, Fortuna Union Elementary School District. An interactive education program for students to learn about energy and then share their knowledge with the rest of the school Mr. Harder's 4th grade class heads the program called the "Green Team."
- 2.3.1.6. [Crafting Models of Efficiency](#) Laura Honda, Manor School Ross Valley School District: The objective of this lesson is to allow students to use their knowledge on energy and creativity to build energy efficient and non-energy efficient cardboard classroom models. Thus, providing a visual comparison between energy efficient and non-energy efficient classroom models.
- 2.3.1.7. [Electricity and Magnetism](#) Kurtis Smith and Dave Massey, Santee Alternative, Santee School District: An application of how magnetism and electricity are related, students observe the spinning of a coil of copper wire that is part of a circuit powered by a battery and attached to a spindle positioned over a magnet and are ask to discuss why the mechanism works in the manner that it does
- 2.3.1.8. [Energy ABCs](#) Linda Gregory, Urbita Elementary, San Bernardino City Unified School District: Students share what they have learned about energy by writing an Energy ABC book which can be shared in the classroom or school library. A higher tech multimedia version is described separately. This is an excellent closure to a unit on energy, but it can also be used as an introductory activity to determine student's prior knowledge and to guide what they need to learn more about
- 2.3.1.9. [Science Fair with an Energy Efficiency Flair](#) Mrs. Laura Honda, Manor School, Ross Valley School District: The objective of this lesson is to get the Energy Conservation message out to our entire community by organizing a school-wide Science Fair with an emphasis on Energy Efficiency, and Environmental Education.
- 2.3.1.10. [Draft-o-meter](#) By Linda Gregory, Urbita Elementary School, San Bernardino City Unified School District: In this lesson, students in grades K-6 learn an easy technique to measure the presence of drafts in their homes and classrooms. In [Worm Warmers](#), a follow-



up lesson to Draft-o-meter, students create draft guards to help reduce energy waste.

- 2.3.1.11. [Why is it hotter when I wear black in the summer?](#) By Jeff Saks, Bemis Elementary School, Rialto Unified School District: In this project based lesson plan, developed by a Green Schools teacher, students in grades K-5 learn how different colors absorb/reflect sunlight in unique ways and apply this knowledge to real world problems.
- 2.3.1.12. [Why is it so hot when I sit next to the window?](#) By Jeff Saks, Bemis Elementary School, Rialto Unified School District: In this project based lesson plan, developed by a veteran Green Schools teacher, students in grades K-5 learn how glass can transmit energy and how applying different tints to the window can reduce the heat passing through the window
- 2.3.1.13. [How Much Energy Do You Use?](#) Recommended for grades 3-6, this lesson allows the students to observe the items that use energy in their home, calculate the energy cost for their own home, and compare this cost with classmates' and with the national average
- 2.3.1.14. [Energy Activities](#) Trying to explain energy can be very difficult. This lesson allows students to observe the effects of energy and develop their own explanations for how events happen. In doing so, students gain a greater understanding of an abstract concept -- energy
- 2.3.1.15. [Energy Sources](#) In this lesson, the teacher demonstrates several different types of energy and assigns a research report topic for small groups of students. (Recommended for grades 4-6)
- 2.3.2. [Middle School Lesson Plans](#) [Home>Educators>Lesson Plans>Middle School Lesson Plans] These lesson plans are suitable for students in grades 6-8. The Same Resources listed on the previous Earth Apple and Elementary Lesson Pages also appear here in the right hand column.
- 2.3.2.1. [How Saving Energy Keeps the Earth a 'Cool' Place to Live](#) By Mark Ziesmer, Sultana High School, Hesperia Unified School District: In this lesson students are introduced to concepts such as electromagnetic radiation and the greenhouse effect. In addition, students gain an understanding of the correlation between burning fossil fuels and greenhouse gas concentrations in the Earth's atmosphere, and how energy conservation can help reduce greenhouse gas emissions.



- 2.3.2.2. [Electricity and Magnetism](#) Kurtis Smith and Dave Massey, Santee Alternative, Santee School District: An application of how magnetism and electricity are related, students observe the spinning of a coil of copper wire that is part of a circuit powered by a battery and attached to a spindle positioned over a magnet and are ask to discuss why the mechanism works in the manner that it does. (Also posted on Elementary Lesson page)
- 2.3.2.3. [Draft-o-meter](#) By Linda Gregory, Urbita Elementary School, San Bernardino City Unified School District: In this lesson, students in grades K-6 learn an easy technique to measure the presence of drafts in their homes and classrooms. In [Worm Warmers](#), a follow-up lesson to Draft-o-meter, students create draft guards to help reduce energy waste. (Also posted on Elementary Lesson page)
- 2.3.2.4. [Energy Savings Activities - Lighting](#) By the Green Schools team at Fortuna Middle School, Fortuna Union Elementary School District: In this lesson, students in grade 8 use the scientific method to examine school lighting technologies and determine if there are opportunities to save energy and money
- 2.3.2.5. [How Big Is Your Footprint?](#) By David Casey, Analy High School, West Sonoma County Union High School District: In this lesson, developed by a Green Schools teacher, students grades 8-12 increase their awareness of the impact of their choices on the Earth by studying the ecological footprint concept. They also learn how to calculate the mean, median, mode, and standard deviation of a set of data.
- 2.3.2.6. [Watt Does It Cost to Use It?](#) By Mark Ziesmer, Sultana High School, Hesperia Unified School District: In this lesson, developed by a Green Schools teacher, students in grades 7-12 learn how electrical usage is counted and priced and measure and evaluate representative household and school electrical items.
- 2.3.2.7. [Window Treatments for Energy Savings](#) In this activity, students will investigate the patterns of heat (radiation, conduction, convection) in the classroom and learn how windows affect a room's comfort. Also, students will find out how to treat windows from the inside to make them more energy efficient
- 2.3.2.8. [The Electric Hookup](#) In this lesson, students will determine the wattage & kWh of various household appliances and identify potential ways to conserve energy.



- 2.3.2.9. [A Home Energy Audit](#) This activity allows student to become building inspectors, identifying features that can help or hurt energy conservation.
- 2.3.2.10. [The Formation of Fossil Fuels](#) In this activity, students will learn about renewable and nonrenewable sources of energy and display this knowledge on a graphic organizer. Also, students will investigate how much fossil fuel we have and how much we use
- 2.3.2.11. [The Appliance Explosion](#) In this activity, students will discover the number and kinds of appliances they have their homes today, and compare this information with the appliances an adult had in his/her home a generation ago. This comparison should help students understand the important role that energy plays in their life, and why energy demand has increased so much in the last twenty years.
- 2.3.2.12. [Energy Transformations](#) In this lesson, students will learn how much energy is found in each kind of fossil fuel, describe the various units used to measure the energy content of fossil fuels, and convert these energy units from one unit to another
- 2.3.2.13. [Acid Rain](#) This lesson engages students in a hands-on experiment where they observe and explain a demonstration of the reaction of acid precipitation on different materials. Then, they predict possible environmental effects of acid rain
- 2.3.2.14. [Cost Effective Buying](#) Students will learn how to evaluate energy-related purchases in terms of cost-effectiveness, utilizing concepts such as "payback" and "rate of return."
- 2.3.2.15. [Converting Fuels to Obtain Energy](#) Students will identify several fuels, their uses, the devices that convert fuel into another form of energy, and students will recognize that some energy is wasted during the fuel conversion process.
- 2.3.3. **[High School Lesson Plans:](#)** [Home>Educators>Lesson Plans>High School Lesson Plans] These lessons are suitable for grades 9-12. The Same Resources listed on the previous Earth Apple, Elementary and Middle School, Lesson Pages also appear here in the right hand column.
- 2.3.3.1. [How Saving Energy Keeps the Earth a ‘Cool’ Place to Live](#) By Mark Ziesmer, Sultana High School, Hesperia Unified School District: In this lesson students are introduced to concepts such as electromagnetic radiation and the greenhouse effect. In addition, students gain an understanding of the correlation between burning fossil fuels and greenhouse gas concentrations in the Earth’s



- atmosphere, and how energy conservation can help reduce greenhouse gas emissions. (Also posted on Middle School Lessons page)
- 2.3.3.2. [How Big Is Your Footprint?](#) By David Casey, Analy High School, West Sonoma County Union High School District: In this lesson, developed by a Green Schools teacher, students grades 8-12 increase their awareness of the impact of their choices on the Earth by studying the ecological footprint concept. They also learn how to calculate the mean, median, mode, and standard deviation of a set of data. (Also posted on Middle School Lessons page)
- 2.3.3.3. [Watt Does It Cost to Use It?](#) By Mark Ziesmer, Sultana High School, Hesperia Unified School District: In this lesson, developed by a Green Schools teacher, students in grades 7-12 learn how electrical usage is counted and priced and measure and evaluate representative household and school electrical items. (Also posted on Middle School Lessons page)
- 2.3.3.4. [Energy Efficiency Ambassadors](#) By Terry Blanke, Eisenhower High School, Rialto Unified School District: In this project based lesson, developed by a Green Schools teacher, students in grades 9-12 research energy conservation devices, build a demonstration project incorporating a device, and display it at an elementary science fair.
- 2.3.3.5. [Exploring a Teaching Career Through an Energy Lesson](#) By Terry Blanke, Eisenhower High School, Rialto Unified School District: In this project based lesson, developed by a Green Schools teacher, students in grades 9-12 research energy and the need for conservation, develop a lesson plan on energy for elementary students and teach the lesson.
- 2.3.3.6. [Conservation for the Ages](#) By Terry Blanke, Eisenhower High School, Rialto Unified School District: In this project based lesson plan, developed by a Green Schools teacher, students in grades 9-12 learn about various types of energy and the need to conserve energy, write a children's story about saving energy, and read their energy books to elementary students.
- 2.3.3.7. [Energy Efficient Homes](#) Students will analyze the factors that influence the energy efficiency of a home design, including site analysis, home orientation, configuration, envelope, space planning, ventilation, heating, cooling, lighting and appliances, water heating, and waste management.



- 2.3.3.8. [Measuring the Number of Calories in Sunlight](#) In this lesson, students will determine the amount of heat available from the sun in his/her area, compare the absorption of solar energy among different collectors, and offer explanations for discrepancies between the data collected and the solar constant.
- 2.3.3.9. [To Conserve or Not to Conserve](#) In this lesson, students present original ideas about how energy is wasted at home/at work and develop/present a program on how to conserve energy in a specific area
- 2.3.3.10. [Generate Your Own Hydropower](#) In this activity, students will generate their own hydropower -- demonstrating how water power is converted to electricity.
- 2.3.3.11. [Energy: The Issue of Renewable Energy](#) In this unit, students learn some basic facts about renewable energy sources, identify pros/cons of each, and explain basic economic concepts used to analyze energy issues
- 2.3.3.12. [Air Pollution: The Issue of Global Warming](#) This series of activities allows students to learn about the issues surrounding global warming
- 2.3.3.13. [Air Pollution: Lesson Plans](#) In this unit students analyze the controversial topic of global warming.
- 2.3.4. [NEW Lesson Plans from the California Green Schools Program](#) Four new lesson plans developed by our own California Green Schools teachers!
- 2.4. **Save Energy At Home:** [Home>Educators>Save at Home]...When students understand why a compact fluorescent is a wiser investment than an incandescent, they can explain it to their parents better than the most carefully designed brochure or public service announcement. Students can stimulate their parents to incorporate energy efficiency into their household purchasing decisions and daily habits. In the [Alliance's Green Schools Program](#), many students conduct an energy audit of their home and recommend energy saving measures to their parents. Or even better—students and parents work together to conduct an energy audit of their home. Check out the Alliance to Save Energy's [Home Energy Checkup and Audit](#) webpage to find out simple steps you can take to make your home more energy efficient. For additional ideas, try out the following lesson plans from Green Schools curriculum that are designed to help improve energy efficiency in the home:
 - 2.4.1. [A Home Energy Audit](#) This activity allows student to become building inspectors, identifying features that can help or hurt energy conservation.



- 2.4.2. [How Much Energy Do You Use?](#) Recommended for grades 3-6, this lesson allows the students to observe the items that use energy in their home, calculate the energy cost for their own home, and compare this cost with classmates' and with the national average.
- 2.5. **Save Energy at School:** [Home>Educators>Save at School] Schools provide a unique opportunity to create a new generation of energy smart citizens. Through energy education, immediate energy savings can be realized by reducing obvious sources of energy waste, such as lights left on in empty rooms and computers running 24 hours a day, 7 days a week. Schools with effective conservation programs have reported reductions of as much as 25% in utility bills.

The best way to save energy in your school is to make it a school-wide effort. Teachers, students, facility staff, and administrators can all play an important role. If possible, enlist the support of your school district. School districts participating in the [Alliance's Green Schools Program](#) agree to return a portion of the savings from the no-cost behavior and operations changes back to the schools that earned them—thus providing an added incentive for those schools to save energy.

- 2.5.1. [School Operations and Maintenance: Best Practices for Controlling Energy Costs](#) School districts wanting to save money and energy may want to take a look at this new manual prepared by Princeton Energy Resources International for the US Department of Energy
- 2.5.2. [Energy Saving Activities for Schools](#) This list of sample activities from the Alliance's Green Schools Program will give you many ideas for ways to involve your students and the school community in promoting energy awareness and saving energy in your school.
- 2.5.3. [Tips for Implementing a School-Wide Energy Efficiency Program](#) (Have to click on the link to get these tips) Ten Steps from ASE for starting a Green Schools Program:
- 2.5.3.1. Step 1. Identify an Energy Efficiency "champion"
 - 2.5.3.2. Step 2. Establish a Green Schools team
 - 2.5.3.3. Step 3. Build partnerships
 - 2.5.3.4. Step 4. Adapt the project to your school's priorities and curriculum
 - 2.5.3.5. Step 5. Identify curriculum tie-ins
 - 2.5.3.6. Step 6. Develop an agreement with the school district administration
 - 2.5.3.7. Step 7. Establish a strong link between energy and the environment
 - 2.5.3.8. Step 8. Establish a baseline of energy use



- 2.5.3.9. Step 9. Determine the need for retrofits
 - 2.5.3.10. Step 10. Maintain high visibility for the program
 - 2.5.4. [School Retrofits](#) Inefficient equipment and technologies that waste scarce dollars and pollute the environment can be upgraded—an investment that typically pays for itself within a few years
 - 2.5.5. [Energy Saving Tips for Schools](#) Simple things your school can do to start saving energy now!
 - 2.5.6. More for Save Energy At School: [Right Column]
 - 2.5.7. [School Energy Efficiency Links](#) Click here to access links to school energy efficiency resources
 - 2.5.8. [Energy Efficient School Construction](#) Interested in constructing an energy efficient school? Check out the resources that we've compiled here.
 - 2.5.9. [Indoor Air Quality](#) Concerned about your school's indoor air quality? Click here to access indoor air quality resources.
 - 2.5.10. [Savings Through Energy Management Program](#) [Home>News>STEM>link to Wilson Educational Services, Inc] This advanced math- and science-intensive program trains a group of 25 students to conduct an energy audit of their school. Savings Through Energy Management Program: Offered by Wilson Educational Services Inc., the Savings Through Energy Management (STEM) Program is an interactive course designed for students in grades 7-12th that teaches the fundamentals of building energy usage through a comprehensive audit of the school. It is presented in five, full-day sessions, one day a week over five weeks, to a group of approximately 25 students. Students prepare an official audit report for school officials with recommendations for energy-saving improvements and estimated electricity and fuel savings. STEM challenges students to exercise advanced math and science skills and offers practical skills for career building. Check out the [STEM Program website](#) for more information. (Is this the prototype for SEAT Training or was STEM renamed and this needs to be updated? See STEM document)
- 2.6. **Tools and Resources:** [Home>Educators>Tools & Resources] on this page we have compiled all the resources and information you need to start energy education in the classroom. Click on the links below to get started.
- 2.6.1. [Pollution Calculators](#) Implementing energy efficient technologies in your facility help prevent utility generated pollution. You can calculate the environmental benefits of an energy efficiency measure using a pollution calculator



- 2.6.2. [Energy Education Resources](#) Access information about and links to high-quality energy education materials
- 2.6.3. More for Tools & Resources...
 - 2.6.3.1. [Teacher Links](#). Links to other energy-related sites of help and interest to teachers. Each link has a detailed description of the resources available.
 - 2.6.3.1.1. Teachers/Custodians
 - 2.6.3.1.1.1. [Energy Star Portfolio Manager](#)
 - 2.6.3.1.2. Energy Education
 - 2.6.3.1.2.1. [EIA Kid's Page](#), [Cool Science](#), [Energy Ed Online](#), [Energy Quest](#), [Office of Energy Efficiency and Renewable Energy](#), Energy Net, [Environmental Web Directory](#), [Florida Solar Energy Center](#), [Federal Resources for Education Excellence](#) , [International Institute for Energy Conservation](#), [National Clearinghouse for Educational Facilities](#), [National Renewable Energy Laboratory Education Programs](#), [The NEED Project](#), [SolarDome](#)
 - 2.6.3.1.3. Environmental Education
 - 2.6.3.1.3.1. [EE Link](#) , EdGateway , [GLOBE](#) , [National Oceanic and Atmosphere Association](#), [Sharing Environmental Education Knowledge](#), [U.S. Environmental Protection Agency Student Center](#)
 - 2.6.3.1.4. Science Education
 - 2.6.3.1.4.1. [Eisenhower National Clearinghouse](#) , [ERIC Clearinghouse for Science, Mathematics, and Environmental Education](#) , [Franklin Institute Science Museum](#), [Resources for Involving Scientists in Education](#), [ScienceNet Links](#)
 - 2.6.3.1.5. Other Links
 - 2.6.3.1.5.1. [Discovery Channel School](#), [Digital Frog International](#)
 - 2.6.3.2. [Savings Through Energy Management Program](#) This advanced math- and science- intensive program trains a group of 25 students to conduct an energy audit of their school. Also listed on previous page



3. Policy Makers

3.1. Energy Bill

3.2. Federal Budget

3.3. Policy Fact Sheets

3.4. Policy Publications

3.5. State Energy Efficiency Policies

3.6. State Policy Bulletin

3.7. Testimony

4. **Alliance Associates:** Alliance Associates are businesses and nonprofit organizations committed to working together to promote greater investment in energy efficiency as a primary means of achieving the nation's environmental, economic, national security, and affordable housing goals. Today more than 150 corporations, trade associations, public interest groups, research organizations, and others work together in strategic partnership with the Alliance to assure that energy efficiency is used effectively in the U.S. and abroad to help meet the anticipated, phenomenal growth in demand for energy.

4.1. Associates program

- 4.2. **Associate profiles:** * Denotes Founder Level Associates (donors of \$25,000 or more) [1E](#), [3M Company*](#), [Acuity Brands - Lighting Group](#), [Advanced Micro Devices, Inc. \(AMD\)](#), [Advanced Power Controls, Inc.](#), [Air-Conditioning, Heating and Refrigeration Institute \(ARI\)](#), [American Association of Blacks in Energy \(AABE\)](#), [American Chemistry Council \(ACC\)](#), [American Council On Renewable Energy \(ACORE\)](#), [American Gas Association \(AGA\)](#), [American Institute of Architects \(AIA\)](#), [American Lighting Association \(ALA\)](#), [American Petroleum Institute \(API\)](#), [American Public Power Association \(APPA\)](#), [Andersen Corporation*](#), [AREVA*](#), [Armstrong International, Inc.](#), [ARUP](#), [Association of Energy Engineers \(AEE\)](#), [Bank of America*](#), [Barnstable County/Cape Light Compact](#), [BC Hydro](#), [Berkshire Gas](#), [BigFix](#), [Bonneville Power Administration \(BPA\)](#), [Brookhaven National Laboratory](#), [Building Performance Institute Inc.](#), [California Center for Sustainable Energy](#), [California Climate Action Registry](#), [California Energy Commission \(CEC\)](#), [Calmac Manufacturing Corporation](#), [Canadian Energy Efficiency Alliance \(CEEAA\)](#), [Cardinal Glass Industries](#), [Carnegie Mellon University](#), [CertainTeed Corporation](#), [Center for Environmental Innovation in Roofing \(CEIR\)](#), [City of Austin/Austin Energy*](#), [ClimateMaster](#), [CMC Energy Services, Inc.](#), [Con Edison Solutions](#), [Congressional Quarterly](#), [Conservation Services Group \(CSG\)*](#), [Constellation Energy](#), [Consumer Electronics Association \(CEA\)](#), [Copper Development Association \(CDA\)](#), [CREE](#), [Current Energy LP](#), [Dallas/Fort Worth International Airport](#), [DegreeC](#), [Dell Inc.*](#), [Delta-Montrose Electric Association \(DMEA\)](#), [Direct Energy](#), [DMJM Harris](#), [The Dow Chemical](#)



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[Company*](#), [Duke Energy](#), [DuPont](#), [Edison Electric Institute \(EEI\)](#), [Electric Power Research Institute \(EPRI\)](#), [Électricité de France International North America, Inc.](#), [E-MON](#), [Encelium Technologies Inc.](#), [EnergySolve Companies](#), [Environmental Resources Management](#), [EPS Capital Corporation](#), [Exelon Corporation*](#), [Extruded Polystyrene Foam Association](#), [Exxon Mobil*](#), [Fairchild Semiconductor*](#), [Florida Power & Light*](#), [GasNetworks](#), [Great Plains Energy*](#), [Green Building Initiative](#), [Greener World Media, Inc.](#), [Greenfiber, LLC](#), [GridPoint](#), [Guardian Industries Corporation](#), [Hannon Armstrong](#), [The Home Depot*](#), [Honeywell International](#), [Hunter Fan Company](#), [ICF International](#), [Intel Corporation*](#), [Intergy Corporation](#), [International Copper Association](#), [International Emissions Trading Association \(IETA\)](#), [Johanette Wallerstein Institute](#), [Johns Manville*](#), [Johnson Controls](#), [Jupiter Oxygen Corporation](#), [Kentucky Office of Energy Policy](#), [KeySpan Energy](#), [Kimberly-Clark Corporation](#), [Knauf Insulation](#), [The Large Public Power Council](#), [Lawrence Berkeley National Laboratory \(LBNL\)](#), [Lehigh Technologies](#), [Lockheed Martin](#), [Maryland Energy Administration \(MEA\)](#), [Michelin North America, Inc.](#), [MicroPlanet, Ltd.](#), [Midwest Energy Efficiency Alliance \(MEEA\)](#), [National Association of State Energy Officials \(NASEO\)](#), [National Electrical Manufacturers Associates](#), [National Grid USA](#), [National Insulation Association \(NIA\)](#), [National Renewable Energy Laboratory \(NREL\)](#), [National Rural Electric Cooperative Association \(NRECA\)](#), [New York State Energy Research and Development Authority \(NYSERDA\)*](#), [Niagara Conservation](#), [NORESKO](#), [North American Insulation Manufacturers Association \(NAIMA\)*](#), [Oak Ridge National Laboratory \(ORNL\)](#), [OptimumEnergy](#), [Orion Energy Systems](#), [OSRAM SYLVANIA*](#), [Owens Corning](#), [Pacific Gas and Electric Company \(PG&E\)*](#), [Panasonic](#), [The Pataki-Cahill Group](#), [Perseus, LLC](#), [Philips Lighting Company*](#), [Plumbing Manufacturers Institute](#), [Polyisocyanurate Insulation Manufacturers Association \(PIMA\)](#), [PPG Industries*](#), [Procter and Gamble/Tide*](#), [PSEG](#), [Rinnai Tankless Water Heater Corporation](#), [Sacramento Municipal Utility District \(SMUD\)](#), [Safety-Kleen](#), [Salt River Project](#), [Schneider Electric*](#), [Sempra Energy*](#), [Sensor Switch, Inc.](#), [The Shelton Group](#), [Siemens Building Technologies, Inc.*](#), [Southeast Energy Efficiency Alliance \(SEEA\)](#), [Southern California Edison \(SCE\)*](#), [Southern Company*](#), [Spirax Sarco](#), [TAS](#), [Tennessee Valley Authority \(TVA\)](#), [Texas A&M University – Energy Systems Laboratory](#), [Texas State Energy Conservation Office](#), [Trane*](#), [The Trust Fund for Electric Energy Savings \(FIDE\)](#), [University of Illinois- Energy Resources Center](#), [U.S. Green Buildings Council](#), [Wal-Mart Stores, Inc.*](#), [Washington Gas*](#), [Western Governors' Association](#), [Whirlpool Corporation*](#), [White and Case, LLP*](#)

4.3. Benefits

4.4. Become an Associate

- 4.4.1. Founder Level— \$25,000 annually or above. Eligible companies generate more than \$20 million in annual revenue or more than 250 employees.



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- 4.4.2. Patron Level — \$10,000 annually or above. Eligible companies generate more than \$10 million in annual revenue or more than 100 employees.
 - 4.4.3. Ally Level — \$5,000 annually or above. All other businesses not falling into above categories. Membership may be upgraded.
 - 4.4.4. Member Level — \$2,500 annually or above. Learning institutions, small not-for-profit organizations, small state offices.
- 5. Media**
- 5.1. News Releases**
 - 5.2. Media Kit**
 - 5.3. For Your Beat**
 - 5.4. Alliance in the News**
 - 5.5. Story Ideas**
- 6. Energy Professionals**
- 6.1. Building Codes Officials**
 - 6.2. Commercial Building Owners and Managers**
 - 6.3. Corporate Executives**
 - 6.4. Federal Energy Managers**
 - 6.5. Home Builders**
 - 6.6. Industrial Energy Managers**
7. **Contributors** (ASE is a 501-C3)
- 7.1. Corporate Partnership Opportunities**
 - 7.2. Individuals**
- 8. Events**
- 8.1. Summit**
 - 8.2. Awards Dinner**
 - 8.3. International Policy Leaders Dialogue**
 - 8.4. Great Energy Efficiency Day**
- 9. e-EFFICIENCY NEWS**
- 9.1. **Monthly News and Updates** from the Alliance to Save Energy. (Contents change monthly but include these overall categories: Industry Leaders Interview, Policy Front, Consumer, Builders Notes, Awareness, Around the World, In Schools and



Universities, EE Insights, Features, and Events) Archived Editions 2004, 2005, 2006, 2007, 2008

- 9.2. **Associates Bulletin:** 4/2008 and June-July 2008: Includes: In this Edition, New Associates, Upcoming Associate Events and Past Associate Events.

HORIZONTAL NAVIGATION FOR CATEGORIES (APPEARS ON EVERY PAGE)

10. Topics

- 10.1. Appliance and Equipment Standards**
- 10.2. Buildings**
- 10.3. Federal Energy Use**
- 10.4. Financing Energy Efficiency**
- 10.5. Home Energy Assessments**
- 10.6. Hotel Energy Efficiency**
- 10.7. Industrial Energy Efficiency**
- 10.8. Insulation**
- 10.9. International Energy Use**
- 10.10. Lighting**
- 10.11. Saving Energy in Schools**
- 10.12. Past Alliance Presentations**
- 10.13. Windows**
- 10.14. Recursos en Espanol**

11. Programs

- 11.1. Appliance Standards Awareness Project (ASAP)**
- 11.2. Building Codes Assistance Project**
- 11.3. China Energy Efficient Windows Initiative**
- 11.4. Commercial Building Initiative (CBI)**
- 11.5. Communications and Marketing**
- 11.6. Data Center Program**
- 11.7. Efficient Windows Collaborative**
- 11.8. Energy Efficient Codes Coalition (EECC)**



11.9. Energy Hog**11.10. Green Campus****11.11. Government Energy Leadership Action Team (GLAT)****11.12. Green Schools**

11.12.1. Energy costs are an enormous expense for our nation's schools. To help free up more resources for education while strengthening academic learning, the Alliance's Green Schools Program engages students in creating energy-saving activities in their schools, using hands-on, real-world projects. Through basic changes in the operations, maintenance, and individual behavior, Green Schools has achieved reductions in energy use of 5 to 15 percent among participating schools. In addition, Green Schools encourages students to apply the lessons of energy-efficiency message in their homes and communities. Learn more about Green Schools and how to get involved and visit our Green Schools in Action page to read featured case studies from our schools.

11.12.2. **Students Leading the Way 2007-2008:** Southern California Green Schools Success Stories (100 pages)

11.12.3. **Green Means Cash for Schools:** Sultana, Desert Trails High Schools, Hesperia School District Honored for Saving Schools \$660,000 with Energy Efficiency Alliance to Save Energy Green Schools Program Award Highlights Student Leadership, Initiatives in Making Schools More Energy Efficient From the Hesperia Star, by Beau Yarbrough - March 7, 2008

11.12.4. [June/July 2008 Update:](#)

11.12.4.1. In This Issue: WATT's NEW, GREEN SCHOOLS & GREEN Campus Innovations SCHOOL & CAMPUS RESOURCES, GREEN SCHOOL/GREEN CAMPUS TEAM,

11.12.5. **[Howard County Film Festival](#)** Check out the winners of the first annual Howard County Energy Efficiency Film Festival

11.12.5.1. First Place: Patapsco Middle School, Energy Conservation Around the House: Like so many of us, the character in this masterful film suffers from high energy bills. We deeply empathize as he struggles to calculate his massive bills, and discover why they take him such epic amounts of time. But help comes in the form of Super Energy Saver, who makes it his mission to save our protagonist's time, money...and of course, energy. Together, the pair travels through the house



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searching for energy-saving methods. Based on true, energy-saving events, Energy Conservation Around the House is packed with humor, special effects, and an unforgettable story. Watch [Energy Conservation Around the House](#)

- 11.12.5.2. Second Place: Clarksville Middle School, Every Day is Earth Day: Drawing on the optimism of kids, Every Day is Earth Day captures the truth behind its own title. The huge cast sparkles with enthusiasm in this delightful montage of game shows, cheers, and real examples of energy-saving. The creators' talent for involving their surrounding community gives this film a unique energy and a message of hope. The film is as fun to watch as it seems like it was to make. Watch [Every Day is Earth Day](#)
- 11.12.5.3. Third Place: River Hill High School, We've Got Trouble: The moving and startling lyrics of this well-crafted rap music video brings attention to the immediacy and locality of climate change. Following in the tradition of 2Pac Shakur, the artists call on ordinary people to make changes in order to change society. In this case, the message is one of energy efficiency, and the musical group makes their point clearly and powerfully. With catchy rhymes and harmonies, We've Got Trouble sends an urgent call to action for energy users everywhere. Watch [We've Got Trouble](#)
- 11.12.5.4. Honorable Mention: Elkridge Landing Middle School, Extreme Energy Makeover: A clever remake of the popular "Extreme Makeover" television show, this film enters the home of an average American energy user. True to form, effervescent energy makeover artists pay a surprise visit to a text book energy hog, and send her on vacation while they revamp her home. This exciting look into a real energy upgrade shows the audience the trendy side of energy efficiency, along with simple possibilities that they can implement in their own homes. Watch [Extreme Energy Makeover](#)

11.12.6. Inside Green Schools

- 11.12.6.1. [About Green Schools](#): [Home>Programs>Green Schools>About Green Schools] A Green School: Improves education through hands-on, real-world learning about energy and energy efficiency and Strengthens schools by saving money on energy costs



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11.12.6.1.1. How Does Green Schools Work?**11.12.6.1.2. What are the Benefits of Green Schools?**

11.12.6.1.2.1. Avoided energy costs and energy tracking services

11.12.6.1.2.2. Student learning and leadership development

11.12.6.1.2.3. Integration with the curriculum –

11.12.6.1.2.4. Improved school staff relations and school morale –read [Green Schools Testimonials](#) from administrators, teachers, and school staff

11.12.6.1.3. **How Are Programs Funded?** Please [contact us](#) if your company or organization is interested in supporting a Green Schools Program

11.12.6.1.4. **How Do I Get Involved?** The program is currently active in about 200 schools in select school districts in California, Maryland, New Jersey, New York, North Carolina, and Pennsylvania. New programs are under development in Texas, Virginia, and Washington, DC and also in India. If your school is located in one of these areas, please [contact us](#) to see if your school district might be able to get involved (participation is often contingent upon funding levels). If we are currently not involved in your state, please feel free to use the following resources to champion your own program:

11.12.6.1.4.1. Read [tips for implementing a school-wide energy efficiency program](#)

11.12.6.1.4.2. Download our [free, multidisciplinary lesson plans](#)

11.12.6.1.4.3. Visit our [saving energy in schools page](#) for ideas on how to involve students in saving energy in your school

11.12.6.1.5. More for About Green Schools...(right Column)

11.12.6.1.5.1. [Not in a Green Schools District?](#)

11.12.7. [Green Schools in Action](#): [Home>Programs>Green Schools>Green Schools in Action] Green Schools participants take pride in their success.



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Read our featured case studies below and click on the links to the right to learn more about our current programs across the United States and abroad. For additional information, comments, or questions, please email greenschools@ase.org.

- 11.12.7.1. Hello Sunshine: Cali Calmecac Students and Faculty Harness “The Power of the Sun”
- 11.12.7.2. And the Winner is...Energy Efficiency!! McKinleyville High McKinleyville, California
- 11.12.7.3. Inside Green Schools In Action (right column)
- 11.12.7.4. [California Green Schools](#) [District of Columbia Green Schools](#) [Maryland Green Schools](#) [New York Green Schools](#) [Pennsylvania Green Schools](#) [Serbia Green Schools](#) [Green Schools Past Participants](#)
- 11.12.8. [Green Schools International](#)
- 11.12.9. [Green Schools Resources](#) On this page you will find information about some of the resources that are made available to schools participating in the Green Schools Program.
 - 11.12.9.1. **The Green Schools Instructional Resources binder** contains high-quality, hands-on lessons and activities that support the integration of energy themes into instruction. Approved and tested by teachers like you, these lessons can be used in the classroom or in a club setting. Students can even use the lessons to teach other students about energy or to complete an energy audit of their home. Activities cover the topics of energy efficiency & conservation, building auditing, energy & the environment, and more. (Description only no information on how to access or acquire)
 - 11.12.9.2. **The Green Schools Tool Kit** is designed to help Green Schools teachers and students investigate energy consumption at their school using professional, state-of-the-art testing equipment, such as watt meters and infrared thermometers. The Tool Kit enables students to collect real data about energy use – and waste – at the school site and evaluate the meaning of the data. (Description only no information on how to access or acquire)
 - 11.12.9.3. **The Green Schools Tool Kit manual** helps teachers and students get the most out of the Green Schools Tool Kit. It describes what each tool is for, how to use it, and what



students can do with it. It also suggests activities that make use of the tools for learning about the school's building energy, including lighting; heating, ventilation, and air conditioning; appliances, motors, and other devices; and general energy use. There are many other investigations that students might propose, once they understand that energy works as a system within a building. (Description only no information on how to access or acquire)

11.12.9.4. **The Green Schools Technology** CD is provided to jump-start the data collection process created by the use of the Green Schools Tool Kit. The spreadsheets provided are samples that may be used as a starting point for spreadsheet organization of the data collected. (Description only no information on how to access or acquire)

11.12.9.5. **More for Green Schools Resources ...**

11.12.9.5.1. [Education Resource Organizations Directory](#) The Directory is intended to help you identify and contact organizations that provide information and assistance on a broad range of education-related topics. (This links to the Ed.Gov Search engine)

11.12.9.5.2. [Teacher Links](#) to other energy-related sites of help and interest to teachers (Detailed on the Tools and Resources page)

11.12.9.5.3. [Energy Saving Tips for Schools](#) Simple things your school can do to start saving energy now! Categories: Lighting, Heating and Cooling, Computers, Appliances, Involve the Whole School Involve the Whole School District

11.12.9.5.4. [Savings Through Energy Management Program](#) This advanced math- and science- intensive program trains a group of 25 students to conduct an energy audit of their school. STEM website link

11.12.9.5.5. [Pollution Calculators](#) Implementing energy efficient technologies in your facility helps prevent utility generated pollution. You can calculate the environmental benefits of an energy efficiency measure using a pollution calculator



- 11.12.9.5.6. [Energy Education Resources](#) Access information about and links to high-quality energy education materials
- 11.12.9.5.7. Resources: The Same Resources listed on the previous Earth Apple, Elementary and Middle School, Lesson Pages also appear here in the lower right hand column.
- 11.12.10. [The Update Kids' Corner](#) Students, We Want Your Story! The Green Schools Gazette Student-Written Newsletter has combined with the monthly Update newsletter. (Links to Update Newsletter)
- 11.12.10.1. [Get Published!](#) Are you proud of what your Green School has done to save energy? Write an article for Kid's Corner.
- 11.12.11. [Update Newsletter](#) (December 2006 –July 2008)
- 11.12.12. More for Green Schools**
- 11.12.12.1. Learning about energy is fun when you include [Energy Hogs!](#)
- 11.12.12.2. [School districts seeing benefits of natural light \(3/22/07\)](#) PDF of article by Adam C. Hartman The Press Enterprise.
- 11.12.12.3. [Arizona Daily Star, Schools Need Energy Efficiency, 7/5/2007](#) (PDF of an article by Jeff Hatch quoting schools energy use statistics from ASE)
- 11.12.12.4. Baltimoresun.com [Green Schools, kids](#) (6/12/2006) (Link takes you to Baltimore sun but no obvious pathway to this article from 2006)
- 11.12.12.5. [Northern California Greenschools Interactive Web Site](#)
- 11.12.12.5.1. The Alliance to Save Energy has been implementing the Green Schools program in select counties of Southern California since 2000. The Alliance subcontracts with California-based [Intergy](#) and [State Environment and Education Roundtable](#) (SEER) to implement the program in the field. To contact Intergy or SEER or learn more about the organizations. Click the links to the right to get started! There are no links to the right.
- 11.12.12.5.2. Featured Top Picks: MySQL Error: 1045: Access denied for user 'apache'@'localhost' (using password: NO) select



```
school,a.schoolId,activity,toppick,toppickdate  
FROM school s,toppick tp,activity a WHERE  
a.schoolId=s.schoolId AND  
tp.activityId=a.activityId ORDER BY toppickdate  
DESC LIMIT 2 (error messages on the web page)
```

11.13. Industrial Energy Efficiency Initiatives**11.14. Municipal Network for Energy Efficiency (MUNEE)****11.15. Renewable Energy and Energy Efficiency Partnership****11.16. U.S. Energy Efficiency Policy****11.17. Responsible Energy Codes Alliance****11.18. Southeast Energy Efficiency Alliance****11.19. Watergy™****12. Countries****12.1. Armenia****12.2. Bosnia & Herzegovina****12.3. Brazil****12.4. Bulgaria****12.5. China****12.6. Czech Republic****12.7. Dominican Republic****12.8. Hungary****12.9. India****12.10. Lithuania****12.11. Mexico****12.12. Moldavia****12.13. Philippines****12.14. Romania****12.15. Russia****12.16. Serbia & Montenegro****12.17. South Africa****12.18. Sri Lanka**

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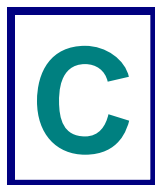
12.19. Thailand**12.20. Ukraine****12.21. United States**

13. **News** [Home>News] Many of the teacher links and resources show a pathway from the “News” (e.g., [Home>News STEM], [Home>News>Pollution Calculators], [Home>News>Teacher Links], [Home>News>Energy Education Resources] however, when the News page is opened there is no obvious pathway from News to the various educational resources.
- 13.1. **Subscribe:**[Home>News>http://www.efficientamerica.org/site/c.ghLUJ9PLKsG/b.2039451/k.4B6/ENewsletter_Sign_Up/apps/ka/ct/contactus.asp?c=ghLUJ9PLKsG&b=2039451&en=nJSL3OTLmKSL3OTKiKOJ3PQKkI5KfMWKsK5JhMYLsK9JsK]
- 13.2. **Alliance in the News** (Lists five recent news articles and a “more” link with a chronological list of nearly 300 news articles from the most recent and dating back to 2004.
- 13.3. **Alliance news Releases**(Lists five recent ASE News Releases and a “more” link with a chronological list hundreds of press releases archived by year starting with 2008 and dating back to 2001.
- 13.4. **Media Contact:** Ronnie J. Kweller Deputy Director of Communication Phone: 202/530-2203 Fax: 202/331-9588 Email: rkweller@ase.org

14. Events**15. About Us**

- 15.1. **Mission Statement**
- 15.2. **Alliance Board**
- 15.3. **Alliance Staff**
- 15.4. **Contact Us**
- 15.5. **Annual Report**
- 15.6. **Jobs**
- 15.7. **Internships**
- 15.8. **Alliance Timeline**
- 15.9. **Virtual Office Tour**
- 15.10. **The Killer Watts**

16. Contact Us



2006-2008 LIVINGWISE® PROGRAM THEORY AND LOGIC – 11/15/07

The LivingWise® Program offers specific curriculum to participating teachers designed to educate sixth grade students about energy use and the effectiveness of energy efficiency measures. It is designed to be part of existing educational efforts and can be targeted to specific regions or neighborhoods through recruitment efforts. Students in participating classrooms apply the concepts covered in class through homework activities that include a simple home audit and installation of efficiency measures (CFLs, low-flow showerheads). Energy savings are based on the installation of these individual measures as reported by students and parents. Sponsors expect that the in-home activities will enhance the educational impact and that students will communicate a direct and personal message about energy efficiency to family members. Ultimately, the program expects to raise awareness of energy-efficiency opportunities generally among participating communities, leading to additional energy-efficiency actions.

The following program theory for the LivingWise® Program builds on the program logic model and provides additional detail on program activities, outputs, and outcomes.

ACTIVITIES

Program Outreach and Recruitment

The primary targets of the program are teachers and sixth grade students in portions of SCE and SCG territory as jointly identified by SCE and SCG. Target areas are identified and teachers are contacted at various events, by phone, fax or email. Through this outreach and enrollment process LivingWise® staff secure the commitment of individual teachers.

The recruitment of teachers in targeted areas allows SCE to reach specific communities and populations that may be otherwise difficult to reach. This (combined with the educational activities) is expected to build interest in energy efficiency in the community generally and awareness of other energy-efficiency opportunities.

Educational Treatment

This is the primary activity of the program. Participating teachers implement the program through curricular content in their classrooms. Assignments include home-based activities that require students to complete a simple home audit and install appropriate measures from a Resource Action Kit provided to them. Activities included in the kit are science-based (for example a student will measure water volume in a set time period before and after a low-flow shower head or faucet aerator is installed).



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The combination of home-based and school-based activities leads to increased awareness among students, who use the opportunity to inform their parents and families (particularly through conducting the home audit). Students provide an effective and accessible message to their families. Interest in energy efficiency is built in the community and parents may consider participating in other SCE programs.

Hands on experience with the Kits and reinforcement at home expected to positively affect the level of information retained.

Verification and Program QA

The program collects results information from Household Report Cards, pre/post-test results collected by the participating students during the audit, teacher evaluations of curriculum and program, and parent response cards. Information is tabulated and reported.

SHORT TERM OUTCOMES

- ➔ **Cost-effective kW and kWh savings and resulting reductions of greenhouse gas emissions result from installation of measures contained in Resource Action Kits.** Measures installed in student homes save energy and contribute to GHG emissions reductions. The program only counts energy savings resulting from reported installed CFL.
- ➔ **Students effectively inform parents and families through assignments and materials.** Students are expected to take their Resource Action Kits home, conduct a simple home audit, and install measures from the Resource Action Kits. It is assumed that through conversations with their parents and exposure to measures in the Kits, the parents of participating students will become more informed about energy efficiency and opportunities for conservation at home.
- ➔ **Program participants are satisfied with the program and with the measures installed from the Resource Action Kits.** Quality assurance activities confirm satisfaction with the program and performance of measures and allow the program to adjust any activities or measures not meeting the expectations of teachers, students or families.

LONGER TERM OUTCOMES

- ➔ **Awareness of and interest in SCE energy efficiency programs grows and leads for other programs are generated by exposure and resultant interest.** Earned media and community interest generated by program implementation in schools could further increase the exposure of energy efficiency programs – ultimately generating leads for other energy efficiency programs.

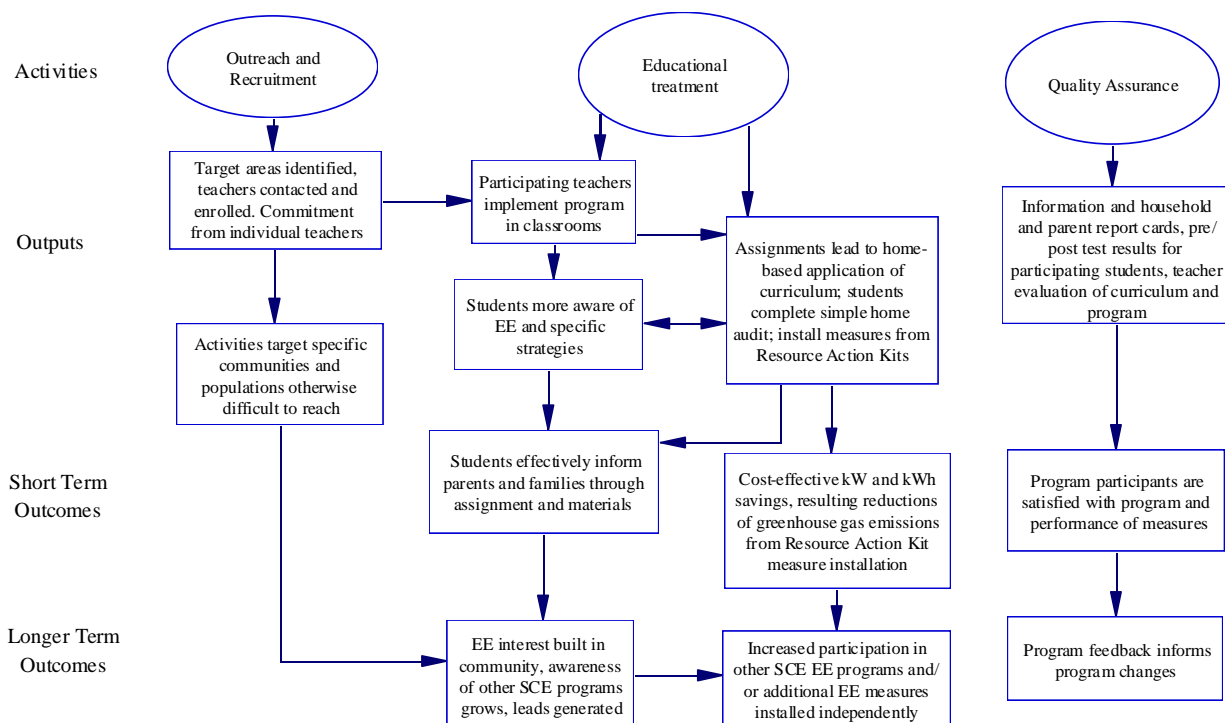


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- ➔ **Participation in other SCE energy efficiency programs increases among targeted communities.** The combination of teachers, students and parents becoming more informed about energy use at home and steps they can take to reduce that use results in broader awareness about energy efficiency in the community generally. Families of Living Wise students participate in other energy efficiency programs
- ➔ **Additional energy efficiency measures are installed independently among households touched by the Living Wise program.** Exposure to materials and curriculum reduces barriers associated with information and search costs and performance uncertainties. The opportunity to “test drive” measures through the Resource Action Kits demonstrates the simplicity and effectiveness of energy efficient products and practices. This in-home experience is more personal and effective than advertising, promotion or other conventional communication. This experience and the resulting knowledge leads to action.
- ➔ **Program feedback informs program changes.** The quality assurance process implemented by Resource Action provides feedback to the program developers and leads to program changes to improve program effectiveness.

Figure C.4: LivingWise® 2006-2008 Program Logic Model

**Logic Model of the Living Wise Program
November 2007**



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GETWISE, GETLIVINGWISE, AND RAP WEBSITES

LivingWise® program participants are supported by and directed to the www.getwise.org website which, along with WaterWise™ and EnergyWise™, are productions of Resource Action Programs (RAP) www.resourceactionprograms.org. Resource Action Programs also provides information about LivingWise at www.getlivingwise.org. *Resource Action Get Wise about Energy and Water Efficiency*, <http://resourceactionblogspot.com> can be accessed from multiple sites and will be described with the RAP website. What follows are descriptive outlines of web sites for *Getwise*, *Getlivingwise*, and the corporate site Resource Action Programs

GET WISE WEBSITE (WWW.GETWISE.ORG) ©2006

The *GetWise Home* page opens with the sketch of a home and the invitation to “Take our home savings tour!” This is the same tour that is positioned on the *Kids Corner*. In the lower left corner is a file box insert with a brief welcome and summary of what visitors and teachers can find on the site. The file box has four tabs which are labeled, **Kids Corner, Teacher Lounge, Local Resources and Contact**. The Resource Action Programs logo incorporating LivingWise, WaterWise and EnergyWise appears in the lower right hand corner.

This website description is done in outline form for the purpose of demonstrating the depth and level of organization. Each outline indentation indicates a deeper level of organization requiring the reader to click on a link to access the information.

17. Kids Corner

17.1. Welcome! (An image of the house, yard and electrical lines on the opening page appear) Students are directed to “Use the icons below (House/X-Box, or Waterwise Kit) to learn how to conserve Earth’s precious resources.” The message mentions that kids will learn about conservation, money savings, tools and energy saving tips. Adventures in Green Valley Activation Code for 2006-2007: 314523 is also shown.

17.1.1. **House Tour:** Throughout your home there are simple ways to save both resources and money.

17.1.1.1. **Start the Tour:** Brings up a floor plan of the house with kitchen, family room, bedroom, bath, laundry and outdoor watering. The visitor can start the tour in any room they wish and while touring each room a miniature home tour schematic is in the upper right hand corner if one wishes to navigate to a different part of the tour. Tips are found by rolling the mouse over the room and then clicking on the tips balloon. Every page includes the date, with options to e-mail/contact, close window or go home, and the 2006 Resource Action Programs copyright



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17.1.1.1.1. Kitchen Tips are offered clicking on the various appliances and a message appears showing a few informational messages about the appliances and also some suggestions under the title, “What Can I Do?”

17.1.1.1.1.1. Oven and Stoves

17.1.1.1.1.2. Refrigerator

17.1.1.1.1.3. Kitchen Sinks

17.1.1.1.1.4. Lighting

17.1.1.1.1.5. Dishwasher

17.1.1.1.2. Family Room Tips are provided for the following: Heat/air, television, fireplace, lighting, window, outlets each of these tips are accessed as above by separate clicks.

17.1.1.1.3. Bedroom Tips: Heat/air, computer, lighting, window, outlet,

17.1.1.1.4. Bathroom Tips: Windows and doors, bath & sink, toilet, shower,

17.1.1.1.5. Laundry Tips: dryer and washer, lighting,

17.1.1.1.6. Outdoor Watering Tips: Pool/spa, grass/lawn, xeriscaping, sprinklers,

17.1.1.2. Fun and Games

17.1.1.2.1. **E-Cards:** “Want to send a free Get Wise e-card to your friends and family? Click here to launch e-cards now.

17.1.1.2.1.1. The visitor can select from six e-cards and then customize their message. If one selects the card to see the entire message, space is provided for recipient information and a message. There is no back button if the visitor wants to choose a different card and closing the window sends the visitor back to the E-card opening page.

17.1.1.2.1.1.1. How do you save electricity? “I turn off the lights when I leave the room”

17.1.1.2.1.1.2. “Turn off the air conditioner in the summer time”

17.1.1.2.1.1.3. “Less than 1% of the earth’s water is drinkable”

17.1.1.2.1.1.4. “Think more use less”.

17.1.1.2.1.1.5. “Have a Get Wise Good Day!”

17.1.1.2.1.1.6. “Turn off the water while brushing your teeth!”

17.1.1.2.2. Games:



17.1.1.2.2.1. Hangman: words included volume and percolate. The game does not show the letters you have already tried.

17.1.1.2.2.2. Missing Square Puzzle: Find out where Max and Milla enjoy spending the summer. Strategically move the pieces into the empty blue square to reveal the answer (4 x 5 square puzzle of 20 images)

17.1.1.2.2.3. New Game: CFL Blinking Light sequence. Pattern recognition and repetition.

17.1.1.3. **Kit Contents:** Images of the three kits, Waterwise, EnergyWise and LivingWise are laying on a table. When the visitor clicks on the kit,

17.1.1.3.1. **Waterwise™ Outdoor:** Each item is numbered and when clicked on the side of the box a small inserted photo of the object appears. The items appear one by one as they are clicked. For each item the name, savings estimate, and installation directions appear.

17.1.1.3.1.1. Seven Function Spray nozzle

17.1.1.3.1.2. Water timer

17.1.1.3.1.3. Hose end

17.1.1.3.1.4. Rain Gauge

17.1.1.3.1.5. Moisture meter

17.1.1.3.1.6. Hose Washers

17.1.1.3.2. **LivingWise®:** Contents have been fully described in curriculum analysis and include: Showerhead, CFL, Limelite, Filtertone, Kitchen aerator, bathroom aerator, water temp check card, air temp ruler, mini tape measure, flow rate test bag, energy cost calculator, Adventures in Green Valley CD (missing from the kit analyzed by the Evaluation team) toilet leak detector tablets, Drip gauge. As above when any one of the first 9 are clicked on an image appears with the name savings and installation process.

17.1.1.3.3. **WaterWise™:** Showerhead, Kitchen Aerator, Bathroom aerator, tape measure, water temp card, drip gauge, flow rate test bag, energy cost calculator, Adventures in Green Valley CD and toilet leak detector tablets.

18. **Teacher Lounge** The File box Welcome to teachers includes three categories: in a top navigation bar that appears on all pages: *Frequently Asked Questions, Links, The Get Wise Blog* and two main categories: *Classroom Activities and Newsletters* will be coming soon.



18.1. Frequently Asked Questions include:

18.1.1. How long does the program take to implement? The program is designed to incorporate in your existing curriculum so your timeline will vary. Generally, the program is implemented between 4 and 10 classroom hours. However, you can spend as little as one class/subject session and as much as a month or longer. It's up to you.

18.1.2. 2.1.8: What materials do I return? How much does the program cost? Who usually sponsors the program? What do the program materials cover? Is there an enrollment deadline to participate? How many kits can I receive? Is there someone who can speak in my school or classroom?

18.2. Links, Links, Links: Here are a few web sites we've found that are designed specifically for teachers. These sites can be valuable resources in enhancing and further developing your curriculum.

18.2.1. [Environmental Education and Training Partnership](#) This site offers educators information, resources, and links for promoting academic achievement and environmental literacy. It describes the Environmental Education and Training Partnership (EETAP), participating organizations, services, and achievements. EETAP is a national leader in the delivery of environmental education training for education professionals. EETAP is funded by the U.S. Environmental Protection Agency's Office of Environmental Education through a cooperative agreement with the University of Wisconsin-Stevens Point.

18.2.2. [Environmental Education on the Internet](#) EE-Link is: **5400** links organized in 300 categories, **11,000+** visitors per day. Browse or Search for resources for professional development, climate change, global warming, lesson plans, endangered species, national and international events, and more. EE-Jobs features 40+ new job listings every two weeks sent to 1250 subscribers weekly. The leading EE newsletter with **7000+ subscribers**, 20+ quality resources per issue, twice-monthly. Announcements, Events, Grants, Teacher Resources

18.2.3. [ENC for Science and Math Teachers](#) ENC offers math and science educators access to information about more than 27,000 print and multi-media curriculum resources and professional development materials. Web-based resources are only available to paid subscribers.

18.3. The Get Wise Blog: There is help when you need it. Need help posting a new topic? Want to know how to edit one of your own posts? With the new Getwise weblog, you can do all these things and more. If you have a specific question, feel free to email one of our great administrators and they will not only answer your question, but they'll add it to the help page so that others will benefit from your questions. Email us at info@getwise.org

18.4. Classroom Activities:



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- 18.4.1.** LivingWise® a pull down menu of the seven “Additional Activities” found in the Teacher Edition. These are provided as PDF files and are easily downloaded.
- 18.4.2.** WaterWise™ English The following 15 activities are provided: Mystery Picture, Mystery Picture Graph, Water Tickets, Water Ticket Cutouts, Water Detectives Unsolved, Case #1426, Water Wise Treatment Maze, Water Sports, Goofy Efficiency Tips, Water Wise Brain Twisters, Efficiency Tips, Hidden Message Graph, Water Wise Crossword Puzzle, Resource Fact Wheel Challenge.
- 18.4.3.** WaterWise™ Spanish the same 15 activites are provided in Spanish
19. **Local Resources:** For more information about water and energy conservation, click on your state to find links to state and federal organizers.
- 19.1. California: If you would like more information on local water or energy, visit your sponsor's website:
- [American States Water Company](#)
 - [California Water Service Company](#)
 - [Casitas Municipal Water District](#)
 - [City of Azusa](#)
 - [City of Big Bear Lake](#)
 - [City of Glendale](#)
 - [City of Hayward](#)
 - [City of Milpitas](#)
 - [City of Port Hueneme](#)
 - [City of Redwood City](#)
 - [City of Torrance](#)
 - [City of Turlock](#)
 - [City of Vallejo](#)
 - [Coastside County Water District](#)
 - [County of Ventura](#)
 - [Imperial Irrigation District](#)
 - [Lodi Electric Utility](#)
 - [Mid-Peninsula Water District](#)
 - [Rosamond Community Service District](#)
 - [Roseville Electric](#)
 - [Southern California Edison](#)
 - [Southern California Gas Company](#)
 - [Suburban Water Systems](#)
 - [Valencia Water](#)
- For additional state and federal water or energy information visit...
- [American Petroleum Institute](#)



[American Water Works Association](#)
[California Delta Protection Commission](#)
[California Department of Water Resources](#)
[California State Water Resources Control Board](#)
[California Urban Water Conservation Council](#)
[Energy Information Administration](#)
[Nuclear Energy Institute](#)
[U.S. Bureau of Reclamation](#)
[U.S. Department of Energy](#)
[U.S. Environmental Protection Agency](#)
[U.S. Geological Survey](#)
[Water Use it Wisely](#)

20. **Contact:** Provides an e-mail form and telephone information to contact Resource Action Programs staff

GETLIVINGWISE ©2005

The Resource Action GetlivingWise Home page and top of every page is organized with a horizontal Navigation Bar which includes the following categories: **About, Tools, and Contact**. The mid-section of the home page and the left hand side of every following **About** page is organized with a Navigation Column including: **How it Works, Measurable Results, Education, Customization, Community Outreach, Manpower and FAQ's**: Each page also includes a location bar showing the pathway taken by the reader to access the current page (i.e., [Home>About>Education]). The following outline shows the Categories and levels of content available on the Getlivingwise website starting with the top of page Navigation Bar and followed by the left hand Navigation Column. Each Outline indentation indicates a deeper level of organization requiring the reader to click on a link to access the information.. Each page includes at least one question and answer and a photo of students and/or teachers who have participated in the program. Approximately six photos of teachers and students are used multiple times throughout the pages. The majority of images are of Caucasian teachers and students with a few Latino and possibly one African American child. Quotes and testimonials from past participants are included on most of the pages. All of the **Tools** pages include a left hand navigation column that includes: **Calculator, Print Media, Videos, Newsletter, PR & Media**

1. **About:** Informs the readers about the Livingwise program, the Purpose of RAP materials. It includes a visual of the LivingWise® Activity Kit with an option to “Click here” to view kit contents” which takes the reader to a page showing each item in the kit with a short paragraph description of the items. The main section of the “**About**” page introduces the 6 categories, detailed below, and which continue as the left side navigation column on each “**About**” page. Each page has on average one to two paragraphs of specific information which appears to be primarily aimed at marketing the program to prospective sponsors.



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- 1.1. **.How It Works:** Shows a house encircled with ten icons that represent the the ten steps required to implement LivingWise. Each item is numbered one through ten and when clicked information appears in the body of the house to describe each step. Below is a listing of the ten icons and a descriptor of the step.
 - 1.1.1. Map of the USA: “**Finding A Sponsor** . The first step in the LivingWise® program is finding a sponsor or a group of sponsors who wish to provide the program in their area. Sponsors can be anyone with a stake in water, gas or electricity conservation.”
 - 1.1.2. Apple: “**Doing The Legwork**. The Resource Action Team contacts teachers within the sponsor's designated territory and enrolls them in the LivingWise program”.
 - 1.1.3. LW Activity Kit: “**Providing The Tools**. LivingWise materials are branded with the sponsor's logo and shipped directly to participating teachers”.
 - 1.1.4. Pencils: “**Conservation Education Begins**. Teachers facilitate in-class LivingWise activities and distribute Resource Action Kits to all their students.
 - 1.1.5. House: “**From The Classroom To The Home**. Each student takes home a Resource Action Kit that contains educational materials, auditing tools and resource efficient devices.”
 - 1.1.6. Clipboard: “**Identifying Inefficiencies**. Students and their parents conduct a simple home audit to determine how much water, electricity and gas they're using and to identify any inefficiencies.”
 - 1.1.7. Showerhead: “**Making Changes**. Students work with their parents to remove old, inefficient fixtures. They replace these fixtures with the new resource efficient devices provided inside each kit.”
 - 1.1.8. Dollar Symbol \$: **Adding Up The Savings**. A second audit is performed by the students and their parents to calculate the resource savings produced by the retrofitting activities.”
 - 1.1.9. Envelope: “**Collecting The Data**. Audit information is collected and the participants are surveyed with a pre/post test to find out how much they learned by participating in the program.”
 - 1.1.10. Report folder: “**Providing The Results**. All collected data is compiled, analyzed and placed into a Program Summary Report that is given back to the sponsors. This report summarizes all of the program results including a breakdown of the resource savings.
- 1.2. **Measurable Results:** Images of running water and a gas burner introduce the reader to “Resource” savings which makes the following claim “The average LivingWise® household saves over 9,000 gallons of water, 330 kWh of electricity, and 40 therms of



gas annually by retrofitting their homes with the devices provided by the program. Over the life of the devices, each household can save over 90,000 gallons of water, 3,100 kWh of electricity, and 400 therms of gas. Therefore, the program creates long lasting savings for a very small initial investment.

- 1.2.1. A 23 page Program Summary Report sample can be downloaded which shows what a sponsor could expect to receive.
- 1.3. **Education:** Shows images of children and the www.getwise.org home page. The text includes the following points. Over 10 years, hundreds of thousands of students, savings of energy and water, program developed by teachers, personalized, hands on, something to be gained by everyone, additional resources, state correlations although it looks like a link it is not active,
 - 1.3.1. **All over the country** when clicked produces a nine page PDF file entitled, “School Participation List” naming 15 States, 365 cities, and countless schools which have participated in LivingWise®.
- 1.4. **Customization:** The LivingWise® program can be custom designed to meet the sponsor's individual conservation goals and budget requirements.
- 1.5. **Community Outreach:** The LivingWise® program displays the sponsor's company logo on the materials that go into the homes. In addition, the community will learn about this generous sponsorship through the press releases and teacher awards generated by the Resource Action Team.
 - 1.5.1. **Link to PR and Media Section:** This link allows the reader to click on a year with the newest being 2005 and extending back to 1997. Only one press release PR is listed in 2005, zero PRs are in the 2004 link, two PRs appear in both 2003 and 2002 and zero PRs appear in 1998 and 1997.
- 1.6. **Manpower** “The program is completely hands off for the sponsor's organization. It requires no manpower or additional resources. Upon sponsorship, the Resource Action Team manages and executes the program from start to finish
- 1.7. **FAQ's:** This page provides 18 questions and the related answers. Questions #5, #14, and #18 link the reader to the sample Program Summary Report. Question #8 links to a list of previous sponsors and question #16 links to the Savings Calculator.
2. **Tools:** This page and the tools provided are intended to support potential sponsors of the program in making their decision
 - 2.1. **Calculator:** Data are entered into the calculator for the following: number of participants, the percentage of homes heated by gas or electricity, the cost per therm and cost per kWh, as well as the cost per gallon of sewer and cost per gallon of water. The calculator then produces a new table showing the estimated savings for one year and for 10 years.



- 2.2. **Print Media** This page shows a photograph and a quote also used on the calculator page. The page has technical difficulty with the quote and photo covering the header. The page shows buttons for brochures, presentations, postcards, and Miscellaneous and none of the links work. Tools and resources and the calculator are merged onto this page and also have technical errors. No print media was found here by the evaluation team.
 - 2.3. **Videos:** The Videos page suffers from the same type of technical errors as the previous page. Although it is a different photo and quote which are covering the header. No videos were found on this page.
 - 2.4. **Newsletter:** Newsletters are listed by the quarter and the year, beginning with the fourth Quarter of 2005 and ending with the first Quarter of 2007. It appears that this site is no longer updated but is still found in a Google search for LivingWise®. The Newsletters listed have the following type of articles: Feature articles on Conservation of Energy and Water, Sponsor Welcome and Thanks, Upcoming Conferences, News briefs, “It’s a Fact”, City and County Spotlights, Money Saving Ideas, Grant Resources, and Staff Highlights, and Contact us. The newsletters are filled with visuals which include students representing a few ethnic backgrounds and a variety of images of conservation.
 - 2.5. **PR & Media:** This link allows the reader to click on a year with the newest being 2005 and extending back to 1997. Only one press release PR is listed in 2005, zero PRs are in the 2004 link, two PRs appear in both 2003 and 2002 and zero PRs appear in 1998 and 1997.
3. **Contact:** Includes a form to fill out and send with spaces for contact information, area of interest (i.e., gas, electricity, or water), nature of the company, number of participants the company would like to reach and space for a message. The bottom of every page has a link to the Corporate Site, Resource Action programs.

RESOURCE ACTION PROGRAMS ©2008 (WWW.RESOURCEACTIONPROGRAMS.ORG)

The Resource Action Programs Home page banner includes the LivingWise, WaterWise and EnergyWise logo. A bold orange band includes the name Resource Action Programs and a quote from, Jennifer Smith a sponsor in San Jose, CA. Next to the quote is the photo of a young Caucasian woman whom one assumes is Jennifer Smith. Four Navigation buttons: **Home**, **About**, **Our Mission** and **Blog** are located above the orange banner. The banner appears on every page except for the Blog which takes the reader to <http://resourceactionblogspot.com>.

Every page, except for the blog, also includes a left hand navigation bar focused on information directed at the following audiences: “Are you a ... **Utility**? ... **Corporation**? ... **Community Service Agency**?...start here”. The bottom of every page also links back to the “Latest News” press releases.



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1. Home

- 1.1. **Latest News** “Audrey Manansala, a sixth grade teacher at Margaret Duff Elementary School, was honored for her outstanding efforts... A photo of Ms Manansala and her class is shown. click to read more. Includes a press release dated August 28, 2008.
- 1.2. **Resource Action Programs** staff photo, “Resource Action Programs, (RAP), designs and implements community programs to reduce residential water and energy use...click to read more. Press Release dated August 22, 2008 details the work of RAP.
- 1.3. **Today I Cut Greenhouse Gas Emission** (Image of a young caucasian boy jumping through air) When clicked it takes the reader to Trade Show dates and locations
 - 1.3.1. [The Behavior, Energy and Climate Change Conference](#)
November 16-19, 2008
Hyatt Regency Hotel
Sacramento, California
 - 1.3.2. [WaterSmart Innovations](#)
October 8-10, 2008
South Point Hotel & Casino
Las Vegas, Nevada
- 1.4. **Post from Our Blog:** Highlights the latest blog posts and a link to subscribe
- 1.5. **Subscribe to Our Newsletter** when clicked take the reader to a subscription form
- 1.6. **Call 1-888-438-9473** to speak to a representative and a link to see all of the trade shows that RAP representatives will be attending
2. **About:** “Resource Action Programs® are a family of community conservation programs designed to increase residential resource efficiency and community awareness. The proven and effective design generates immediate savings in home water and energy use while providing a maximum return on investment. For over 15 years we have helped sponsors meet and exceed their resource conservation goals. Each resource action program is completely customizable and fully implemented by our in-house program staff
 - 2.1. **Contact Us:** Provides phone, fax, e-mail link, physical address w/linked map and operating hours
 - 2.2. **Our Mission:** Is an alternate pathway to the same mission statement page located in the header navigation bar
 - 2.3. **Employee Information:** The name, title, phone extension and an e-mail link are provided fro the CEO, President, VP, Director of Marketing, Senior Program manager, three Program Managers, two Project Managers, the California Outreach Coordinator, two graphic designers, and three Administrative Assistants for a total of 17 employees.
 - 2.4. **Latest News:** Is an alternate link to the same press releases shown on the Home page.



- 2.5. **Tradeshows:** Is an alternate pathway to the same tradeshows listed previously in two separate links on the Home Page
3. **Our Mission:** Resource Action Programs emphasize conservation education, designed to introduce families to the concept of natural resources, while teaching them the importance of conservation in their daily lives. Our program's focus is on energy and water awareness, with the goal of education and an increased feeling of environmental responsibility. Our personalized education approach is truly unique. By using hands-on learning, accommodation to different learning styles, adaptive lesson plans, and flexible time schedules, there is something to be gained by everyone involved. Our main priorities are teaching the value of clean water and energy, where our resources come from, the impact of everyday actions and the power of individual and collective action
4. **Blog:** RAP Get Wise about Energy and Water Efficiency Blog Spot <http://resourceactionblogspot.com> is a separate site and will be described in a subsequent section.

As mentioned previously, each page, except for the blog, includes a left hand navigation bar focused on information directed at the following audiences: “Are you a ... **Utility?** ... **Corporation?** ... **Community Service Agency?**...start here”. Two of the audience links have a roll over feature revealing the options available and which will be described below.

1. Are you a **Utility?**

- 1.1. **Direct Mail:** Three paragraphs describe the Direct Mail benefits: “an economical outreach for adult efficiency programs, customized, proven models, original announcements, educational and kit contents, region-specific data, desired branding. Incentives and desired outcomes designed to match objectives and existing program, interested individuals respond via toll-free phone numbers to our Call Center, postage-paid reply cards, or online via the web. All fulfillment services are handled in-house. Complete data management services available, and secondary mailings or ongoing communications with participating households can easily be arranged. Mailing lists to low income families.
- 1.2. **Product Sales:** Contact information and hours of operation
- 1.3. **School Programs:** Begins with the ten steps written descriptors from the previously described www.getlivingwise.org site, no images are included. The content then duplicates the Education information on the previous website and links to the www.getwise.org site. The text continues with “Measurable Results, Customization and Community Outreach” which are also shortened versions from the [getlivingwise.org](http://www.getlivingwise.org) site. Although mentioned here there is no live link to the Program Summary Report. Each link below appears to be shorter marketing descriptions of information already detailed in previous sections. The programs have links to colorful PDF documents that summarize the program the benefits, and the kit contents. The calculator is also from [getlivingwise](http://www.getlivingwise.org).



1.3.1. **FAQ**

1.3.2. **School Program Details:** provides duplicate links to everything listed below so multiple pathways are provided.

1.3.2.1. **Livingwise**

1.3.2.1.1. **Livingwise Savings Calculator:** The 2005 version

1.3.2.2. **Waterwise**

1.3.2.2.1. **WaterWise Saving Calculator**

1.3.2.3. **WaterWise Outdoor**

1.3.2.4. **EnergyWise**

1.3.3. **Sponsors**

2. **Are you a Corporation?** Marketing aimed at corporate savings: “Enhance employee awareness of energy and water efficiency through training and communication. Did you know an office building of average operating efficiency with 50,000 square feet of office space can reduce operating costs by \$40,000 per year, through no-cost and low-cost actions?”
3. **Are You a Community Service Agency?**
 - 3.1. **Earthwise:** EarthWise is an A-list (household/community service) fundraiser established to help organizations offset the costs of activities while providing a measurable benefit to communities and the environment.
 - 3.1.1. **EarthWise Order Form**
 - 3.2. **Easy Savings:** “Easy Savings is a customizable program developed to educate consumers while providing energy saving solutions for use in their home.

BLOGSPOT ([HTTP://RESOURCEACTIONBLOGSPOT.COM](http://resourceactionblogspot.com))

The Resource Action Get Wise about Energy and Water Efficiency Blog Spot contains

1. **Informational articles** on conservation, energy and water issues. posted primarily by RAP staff such as
 - 1.1. **Frustration Free, Ouch Free.** Amazon introduced ‘Frustration Free Packaging’ just in time for this holiday season. Right now, they currently have 19 products; with the hopes of expanding into more; with this new Frustration-Free packaging. Posted by Katrina
 - 1.2. **Happy Birthday: Germs and Hand washing** posted by Katrina
 - 1.3. **New Study Show California’s Air Pollution Kills More People than Auto Accidents.** Study from CSU – Fullerton. Posted by Dave Munk
 - 1.4. **The Gift of Giving: Holidays and Waste** posted by Katrina



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2. **Followers** (Katrina and Loyd both RAP employees)
3. **Favorite Links**
4. **Ads by Google**
5. **My favorite blogs** (Linked to “Green” ideas)
6. **Blog Archive** dating back to April 2008
7. **RSS “Weekly Grist” Podcast** Top green stories around the world
8. **Contributors** (11/16, and possible more, are RAP contributors)
9. **Blogcatelog** Link to Environmental Activism Blogs
10. **Two Surveys** for heating source and CFL’s in the home
11. **Rate My Blog** (no rating to date)
12. **My Zimbo:** (Summary of articles posted and rating option (no rating to date))





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GREEN CAMPUS PROGRAM THEORY AND LOGIC – 11/14/07

Green Campus Program Theory and Logic Model Integrated Schools Program Southern California Edison

INTRODUCTION

Energy costs for college campuses can be an enormous expense, the second largest expense for schools after employee salaries. At the same time, college tuition rates are at an all time high at most colleges across the nation. Compounding the problem has been a lack of awareness of how individual behaviors impact energy consumption and the resulting impacts for the campus community. This program aims to help the school market overcome these and other barriers they face in adopting energy-saving initiatives to help them achieve a sustainable green campus model.

The major premise of the program is that college students, while often concerned about environmental issues, often lack an awareness of how their individual behaviors can make a difference. Through the program, environmentally aware students are given leadership opportunities to demonstrate to the campus community how personal initiative can make a difference by becoming “energy smart citizens.”

The following document describes the program, identifies market barriers, indicates goals, explains strategies, and serves as a guide for future process and impact evaluations or market assessments. Southern California Edison (SCE) recognizes that this logic model and program theory might change as new elements are added to the design and delivery of the Green Campus Program.

MOTIVATION

This assessment, which includes the enclosed program theory and logic model, was conducted in order to codify the program for the current 2006-2008 program cycle. The assessment starts off with a systematic description of the assumptions underlying the program which provided the rationale for the program design and delivery model. Next, the report identifies program activities and outcomes, and the causal linkages between the two in order to establish testable hypothesis which can be used in an evaluation study to determine if program activities are causing the desired outcomes for the program. This component of the report takes the form of a “logic model”, which graphically represents the relationships between the program’s major components and their intended outcomes. The assessment does not include an analysis of program performance indicators for each linkage in the logic model and associated data sources,



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a task which will be developed independently by program evaluators for any future process or impact evaluations for the current program cycle.

PROGRAM DESCRIPTION

The Green Campus (college) Program offered by the Alliance to Save Energy is modeled after their Green Schools (K-12) Program, with a mission to educate the campus community on the importance and methods for saving energy while helping college campuses realize immediate energy savings. The core program is based on student led campaigns which are geared towards improving knowledge and awareness of energy conservation opportunities on campus that can be taken at the individual and institutional level.

Specifically, trained student interns hired for the program are empowered to create energy efficiency activities and programs that are most appropriate to the needs of their campus with other fellow student volunteers, campus faculty and staff. These activities may take the shape of public awareness campaigns which educate the campus community on the two most critical factors affecting changes in energy consumption, the “why” and the “how” of energy savings. Associated campaign activities are also geared towards achieving immediate cost and energy saving impacts on campus by encouraging students, faculty and staff to adopt new behaviors as energy consumers. Students may also elect to propose specific energy policy changes with campus staff after conducting energy audits on campus.

While activities may vary across participating campuses, the goals for each remain the same and must meet program goals in order to be approved. All of the planned events are designed so that performance indicators can be tracked and reviewed for students to learn from their results. Activities may include energy-saving competitions, or “decathlons” where campus residents compete to reduce energy savings after interns establish energy usage baselines in their residence halls. Results are tracked and winners announced to maintain a high level of participation and interest.

In addition to energy savings competitions in the dorms, Green Campus interns and volunteers also work in partnership with faculty, administration and staff to identify additional potential energy savings opportunities throughout campus to promote energy efficiency and conservation throughout the school year. Students are also encouraged to incorporate resource efficiency into their academic learning to increase their knowledge of energy efficiency through independent study, research assignments, and attendance in conservation related courses on campus. Finally, they are also encouraged to organize educational events on campus such as CFL exchanges, movie screenings, panel discussions and other activities to help raise awareness and encourage actions that result in energy savings on campus.



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MARKET BARRIERS

Barriers facing the schools market segment include information search costs, performance uncertainty and organizational practices. The program is designed to overcome these barriers in the following specific ways:

The Green Campus Program is designed to overcome information gaps by increasing awareness of available energy efficiency measures that can be taken on campus. While campus members want to “do the right thing,” they often lack the motivation to change their behavior or to seek out alternative products that are more energy efficient. To overcome this problem, the program encourages students to develop creative, custom approaches including dorm energy saving competitions that work to energize, engage and reward students to adopt new energy conservation steps which result in immediate energy saving impacts.

It has been difficult to make energy conservation a priority on campus due to competing demands for the time and attention of students and staff. The Green Campus Program overcomes this barrier by hiring paid student interns who can organize and prepare energy conservation activities that make it fun and easy for other students to participate in, while supporting busy campus staff who are often too busy to take similar steps. They also engage highly motivated student volunteers who are able to take on leadership roles to identify and inform administrators about opportunities for adopting efficiency practices on campus.

PROGRAM GOALS

The Green Campus Program delivery model is based on the assumption that college students are in the best position to be able to organize and plan activities focused on engaging the broader campus community to not only raise awareness on the need to conserve energy but also to educate and motivate their peers, as well as campus faculty, administrators and staff, to take specific steps to reduce their energy consumption. College student interns who participate in the program play a central leadership role in planning and carrying out the activities of the Green Campus Program under the guidance of Alliance Staff and in consultation with campus faculty, administrators, and facility staff in a shared partnership effort.

Students benefit from the program by gaining leadership skills, project management skills, and energy conservation expertise. In turn, the larger campus community becomes positively impacted by their role in the program through knowledge diffusion related to energy conservation. Steps taken to conserve energy through campus wide initiatives conducted through the auspices of the Green Campus Program not only lead to energy savings in the near term, they also lead to the adoption of new learned behaviors that will influence individual choices about energy consumption in the future.

Specifically, the Green Campus Program is designed to achieve the following goals:



- ➔ Create effective and lasting student-staff partnerships that lead to systemic and sustainable energy efficiency programs on campus;
- ➔ Build student awareness about the relationship between energy efficiency and the environment and the need to use energy efficiently.
- ➔ Design and implement student-led campaigns that result in immediate and measurable energy savings impacts;
- ➔ Encourage faculty and staff to develop academic courses and symposia that educate students about energy conservation and sustainable environmental practices.

PROGRAM STRATEGIES AND ACTIVITIES

To kick off the program at each participating campus key administrators, facility staff, students and faculty engage in planning meetings where they are introduced to the Green Campus Program; discuss the role of energy efficiency and demand response on campus; and engage in a planning process that will result in the establishment of goals and priorities for the school year.

In particular, participants will jointly set goals for:

- ➔ Identifying opportunities for saving energy on campus
- ➔ Integrating program activities into academic learning
- ➔ Educating the larger campus community on the need for energy conservation as a way to influence and persuade others to adopt new energy efficient practices.
- ➔ Exploring mutually beneficial partnerships and collaborative opportunities.

Once an agreement on goals and priorities for the program are reached, participants identify the research, information and partners needed for successful project implementation.

Implementation planning activities are ongoing and continue throughout the year as follows:

- ➔ Recruitment and training of interns to work on key facets of program development and implementation over the summer, including conducting research, developing partners, and coordinating campus outreach campaigns which include incoming freshmen.
- ➔ Hiring and supporting additional interns to work on program implementation throughout the school year. The program supports 40 hours per week of paid intern time. The number of interns hired on a given campus will vary from school to school and will depend on the number of highly qualified applicants. The program will work closely with the newly hired interns as they identify their objectives, draft a detailed implementation plan, and work towards implementing their plans.



- ➔ Conduct a training session for interns which will include an introduction to the components of the Green Campus Program and energy use on campus, as well as in-depth training on topics such as meeting facilitation, marketing, budgeting, reporting, and other program related knowledge and skills. The Alliance will work with the interns to capture ideas generated at the training session to incorporate into their evolving implementation plans.
- ➔ Conduct a campus fall strategy session with student organizers, key administrators, facility staff and faculty at each campus facilitated by Alliance Staff. Interns will bring new participants up to speed on the program, report on activities conducted to date, unveil future plans, and solicit feed-back.
 - Meeting participants will revisit program goals and finalize planning for the fall term. Following the fall planning meeting, the program will meet with interns and help them modify their implementation plans, incorporating meeting participants' suggestions and comments.
- ➔ The Alliance will also provide ongoing support to interns, in the form of bimonthly conference calls and periodic campus visits, to assist the interns in carrying out their Green Campus plans and activities.
- ➔ Convene mid-year meeting of all participating campuses. This event will bring interns together with administrators, faculty, and staff from various campuses. Meeting attendees will share successes, discuss challenges, and plan Green Campus activities for the remaining half of the academic year. Training sessions on best practices, professional skills, careers in the energy field, and emerging technologies also take place at these mid-year meetings.
- ➔ Integrate energy efficiency and conservation into course curricula. The program will work with interns and faculty of various disciplines to tie Green Campus activities into students' academic plans. Students will be encouraged to take many different approaches, such as working with campus faculty and administrators to develop a class based on the Green Campus Program, or conducting a semester-long practicum or independent study based on an aspect of campus energy use. Interns and participating students will document the results of their research and, when appropriate, will be encouraged to make policy recommendations related to campus energy efficiency and conservation to administrators based on their findings.
- ➔ Convene end-of-year meeting of all participating campuses. The program will work with interns to review the year's progress, recognize group and individual accomplishments, and plan for the summer and following year. Training sessions on best practices, professional skills, careers in the energy field, and emerging technologies also take place at year end meetings.



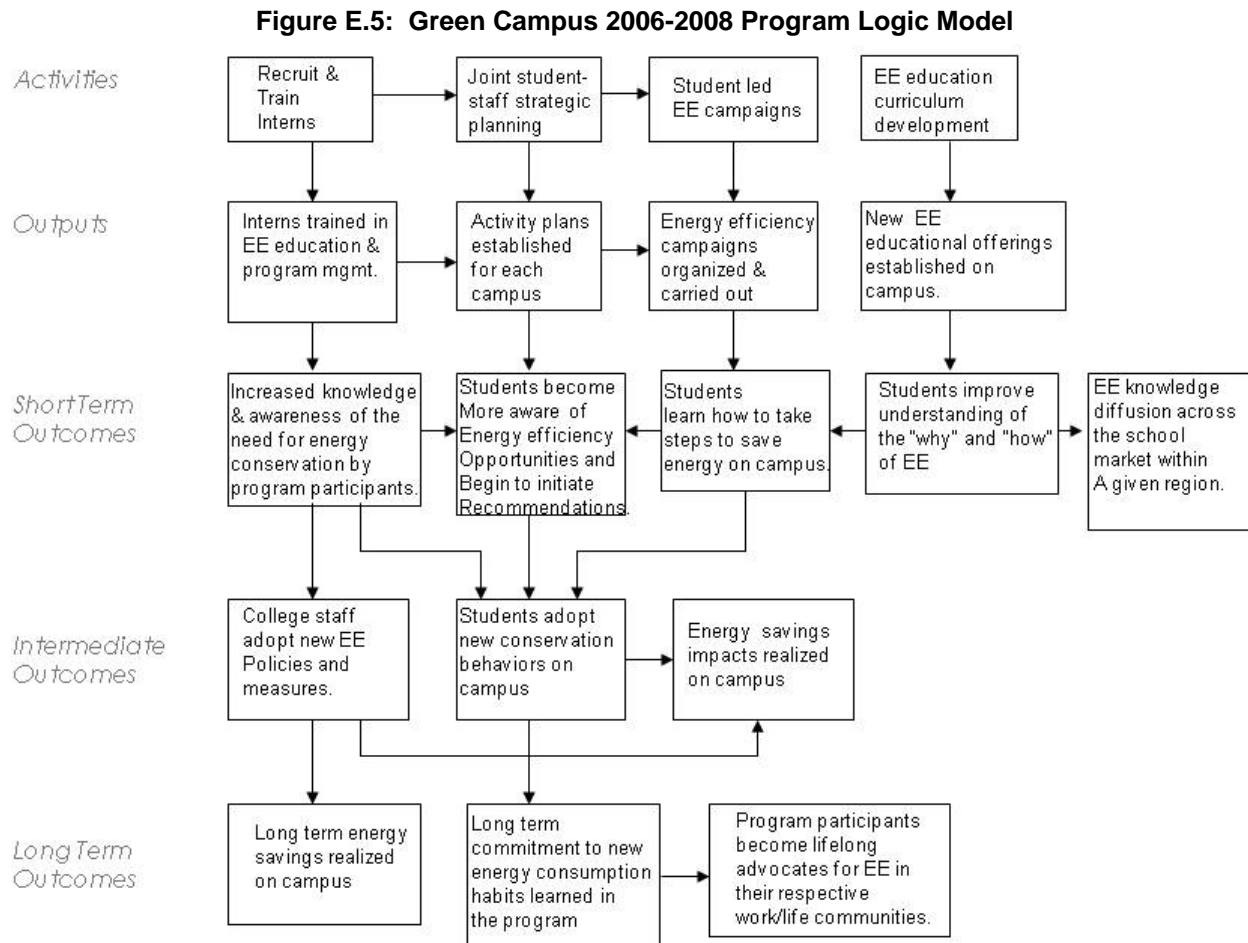
EXTERNAL INFLUENCES

Previous evaluations indicate that a key success factor for achieving the desired outcomes is participant motivation and availability. The program, therefore, is expected to be impacted by the various non-program related factors that influence the motivation and availability of participants, including such factors as conflicting demands on their time, and the ability to coordinate meeting times when key participants are able to meet.

RELATIONSHIP TO OTHER PROGRAMS AND ACTIVITIES

The Green Campus Program is related to the Green School (K-12) Program, both managed by The Alliance to Save Energy.

PROGRAM LOGIC MODEL



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Figure E.1 graphically represents the program theory to demonstrate how the activities, outputs, short and long term outcomes expected for the 2006-2008 Green Schools Program are causally related.

REFERENCES

- ➔ *SCE Integrated Schools Program Implementation Plan*, 2007
- ➔ *Green Campus 2004-2005 Program Evaluation Report*, Skumatz Assoc.
- ➔ Chen, H. (2005) *Practical Program Evaluation*. Sage, Newbury Park.
- ➔ Rogers, P. et al. (2000) *Program Theory in Evaluation: Challenges and Opportunities*. Jossey-Bass, San Francisco.



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UNIVERSITY COMMITMENTS TO SUSTAINABILITY

This appendix examines the administrative commitments to sustainability in place at the four Green Campus universities in Edison's service territory. Because administrative commitments at the system level in the University of California and California State University systems influence commitments at the campus level, this appendix reviews sustainability commitments in each university system before examining commitments specific to each Green Campus university. This appendix also includes a synopsis of Harvard University's sustainability efforts and student-led energy efficiency programs.

The evaluation team gathered the information in this appendix in a review of websites detailing the sustainability efforts of each university.

SUSTAINABILITY COMMITMENTS IN THE UNIVERSITY OF CALIFORNIA SYSTEM

The University of California system has pursued sustainability on an institutional level since 2003, and most recently articulated its sustainability goals in 2007. A system-wide Sustainability Steering Committee leads the system's sustainability efforts. The committee is made up of vice chancellor-level or associate vice chancellor-level representatives from each campus, as well as faculty representatives, the student regent, a representative from the State of California, and graduate and undergraduate student representatives.

There are six working groups under the Sustainability Steering Committee. These groups focus on Green Building, Sustainable Transportation, Sustainable Operations, Sustainable Purchasing, Sustainable Foodservice, and Climate Change. Each working group has members from all 10 University of California campuses, and members are appointed by the Sustainability Steering Committee from each campus. In addition, there is a group made up of waste reduction and recycling professionals from each campus that also reports to the Sustainability Steering Committee.

Two of the Green Campus universities within Edison's service territory are part of the University of California system: UC Irvine and UC Santa Barbara.

Sustainability Commitments at UC Irvine

UC Irvine has signed the *American College and University Presidents Climate Commitment*, and its sustainability efforts on an administrative level reflect the requirements of that commitment. With the goal of reducing greenhouse gas emissions over time, the commitment requires UC Irvine to create institutional structures to meet the goals of the commitment, select and



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implement actions to reduce greenhouse gas emissions, complete a comprehensive greenhouse gas inventory, develop an action plan for becoming climate-neutral, and make information about its efforts publically available.

As part of its efforts to meet these requirements, UC Irvine has formed a Sustainability Committee. The Vice Chancellor for Administrative and Business Services leads the committee and members include administrators from a range of departments, as well as faculty members, dining staff, students, and others. The committee meets four to five times per year and carries out its work continually. According to the committee's charter, student representatives come from student government and UCI's Students for Sustainability student group, a chapter of the California Student Sustainability Coalition.

Sustainability Commitments at UC Santa Barbara

In 2008, UC Santa Barbara published a *Campus Sustainability Plan* outlining the campus's goals for the next 20 years in a wide range of areas related to sustainability. The Associate Vice Chancellor for Administrative Services is responsible for implementing the plan. There is a campus sustainability manager within the office of the Associate Vice Chancellor for Administrative Services who plays a significant role in pursuing the plan's goals. The Geography Department also has a Campus Sustainability Coordinator within its Campus Sustainability Academics and Research division. While other campus stakeholders are involved in efforts related to sustainability, UC Santa Barbara does not have a formal, interdepartmental, committee to oversee sustainability efforts.

SUSTAINABILITY COMMITMENTS IN THE CALIFORNIA STATE UNIVERSITY SYSTEM

To comply with California's AB 32, *The Global Warming Solutions Act of 2006*, which requires the State of California to reduce its carbon emissions to 80% of 1990 levels by 2050, the California State University system will need to increase its energy efficiency accomplishments by 100% to 200%. This has led the system to pursue energy efficiency projects that cost between \$800 and \$2,000 for every metric ton of carbon emissions avoided.

As part of this effort, the CSU system has established a Sustainability Advisory Committee made up of individuals with the ability to engage faculty, staff, and students in sustainability efforts on the system's campuses. Two Green Campus universities within Edison's territory are part of the CSU system: San Bernardino and Cal Poly Pomona. Neither of these universities was represented on the CSU Sustainability Committee as of June 2007.



Sustainability Commitments at CSU San Bernardino

CSU San Bernardino has not established any committees focused on sustainability and the university has no staff positions formally directed to pursue sustainability. The campus energy manager and the facilities services director work together to coordinate sustainability efforts.

Sustainability Commitments at Cal Poly Pomona

Like UC Irvine, Cal Poly Pomona has signed *the American College and University Presidents Climate Commitment* and the university has formed a task force to address the commitment's requirements. The Vice President for Administrative Affairs and the Director of the Center for Regenerative Studies co-chair the task force. In addition, Cal Poly Pomona's Director of Facilities Planning is in charge of the campus's sustainability efforts, with cooperation from the facilities planning, facilities management, and energy services units.

CASE STUDY: SUSTAINABILITY EFFORTS AT HARVARD UNIVERSITY

High level administrators at Harvard University have demonstrated a strong commitment to sustainability and Harvard's experience illustrates the potential for student-led energy efficiency efforts in environments where such a strong administrative commitment to sustainability exists. Harvard has committed to reducing its greenhouse gas emissions by 30% from their 2006 levels by 2016 and the University requires that all its new construction achieves a minimum LEED Silver certification. Harvard is also pursuing a range of goals related to sustainability and efficiency generally.

To achieve these goals, in 2008, Harvard established an Office for Sustainability that reports to the Executive Vice President. This office grew out of Harvard's Green Campus Initiative, an effort that began in 1999 with one full-time staff member. Harvard's Green Campus Initiative promoted cost-effective, energy-saving methods across the university and reinvested the money saved through energy efficiency in additional programs. The initiative also provided loans to departments in need of capital to undertake energy efficiency upgrades. Currently Harvard's office for sustainability has 19 staff members.

One part of Harvard's sustainability efforts is the Resource Efficiency Program (REP), which, like the Green Campus Program, employs students to promote energy efficiency and other behaviors related to sustainability among their peers. Each of the REP program's student employees is assigned to carry out energy efficiency programs within one of Harvard's campus housing units. In this way, the REP program functions in a similar way to a university's system of residence advisors, who provide a range of advice and resources to students within a specified area of a residence hall. The REP is not associated with volunteer groups in the way that the Green Campus Program is.



Although it differs in structure from the Green Campus Program, the REP program offers an example of the role that student employees can play in promoting energy efficiency among their peers at a university that demonstrates a strong commitment to sustainability.



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GREEN CAMPUS INTERN GOALS AND ACTIVITIES

Table G.1 shows Green Campus intern goals and activities carried out during the 2007-2008 academic year, as reported in the process evaluator's survey of interns.

Table G.1: Green Campus Intern Goals and Activities

PROGRAM GOAL	GOALS INTERNS ESTABLISHED FOR GREEN CAMPUS PROGRAM AT THEIR UNIVERSITY	PROGRAMS INTERNS CARRIED OUT (Number of Universities at Which the Program Occurred)
<p>Increase awareness of the relationship between energy and the environment among students.</p>	<ol style="list-style-type: none"> 1. Build student awareness about the importance of saving energy. 2. Increase visibility [of the Green Campus organization] with the student body. 3. Improve dorm education program and expand it to other housing communities. 4. Start an energy education program through campus housing including an energy efficiency competition. 	<ol style="list-style-type: none"> 1. Earth day celebration (2) 2. Welcome week for campus apartment residents (1) 3. Apartment audit pilot (1)* 4. Film screenings (2)* 5. Spring Insight event (1) 6. Green Campus blog (1)* 7. Tours of a "green" dorm room (1) 8. Energy education program in campus housing (1)*
<p>Increase awareness of the relationship between energy and the environment among faculty, staff, and administrators.</p>	<ol style="list-style-type: none"> 1. Educate the campus community about energy efficiency. 2. Educate the campus on why saving energy is important. 3. Begin office energy auditing. 4. Establish new projects based on successful projects at other schools, like office energy auditing. 5. Complete energy audit of parking garage. 6. Begin new energy efficiency projects like office audits. 	<ol style="list-style-type: none"> 1. Building audits (2)⁺ 2. Office audits (2)⁺ 3. Exit sign audits (1)* 4. Energy Audit of the school president's home (1)* 5. Energy audit of parking structure (1)
Continued		



PROGRAM GOAL	GOALS INTERNS ESTABLISHED FOR GREEN CAMPUS PROGRAM AT THEIR UNIVERSITY	PROGRAMS INTERNS CARRIED OUT (Number of Universities at Which the Program Occurred)
<p>Increase students' actions that save energy on campus.</p>	<ol style="list-style-type: none"> 1. Increase the amount of quantitative projects with direct measurable energy savings. 2. Promote energy savings, mainly through CFL give-aways. 3. Save energy through student-led projects and initiatives. 4. Expand energy competition. 5. Measurable savings for our energy efficiency projects (having hard metrics of watts/dollars saved). 6. Get quantitative savings for the campus. 7. Work toward sustained energy conservation. 8. Create programs that promote energy efficiency. 9. Get qualitative savings for the campus. 10. Achieve measurable energy savings. 11. Have student-led programs like CFL exchanges, energy competitions, and energy audits. 	<ol style="list-style-type: none"> 1. CFL exchange (4)⁺ 2. Energy competition in residence halls (2) 3. Delamping campaign (1)[*] 4. Fume hood energy saving campaign (2)[*]
<p>Create partnerships among students, faculty, and staff that lead to ongoing energy efficiency.</p> <p><i>Continued for: Organizational development goals</i></p>	<ol style="list-style-type: none"> 1. Transition smoothly by maintaining projects and relationships with stakeholders. 2. Promote energy efficiency throughout campus by getting students and faculty involved. 3. Collaborate with other "Green" organizations on campus. 4. Build partnerships with faculty members and other campus organizations. 5. Incorporate other clubs with similar goals into Green Campus efforts. 6. Develop relationships with different campus organizations. 	

Continued



PROGRAM GOAL	GOALS INTERNS ESTABLISHED FOR GREEN CAMPUS PROGRAM AT THEIR UNIVERSITY	PROGRAMS INTERNS CARRIED OUT (Number of Universities at Which the Program Occurred)
<p>Create partnerships among students, faculty, and staff that lead to ongoing energy efficiency (cont.)</p> <p><i>Organizational development goals are included because they promote the sustained functioning of the Green Campus program.</i></p>	<ol style="list-style-type: none"> 1. Build up the Green Campus team of interns. 2. Establish a new team of Green Campus interns to develop and grow the program. 3. Locate interested students to become interns. 4. Spread the word about our organization. 5. Increase the public's general awareness of Green Campus. 	
<p>Develop energy education curriculum.</p>		<ol style="list-style-type: none"> 1. Attempted to connect with public schools to teach energy efficiency (1)*
<p>Integrate energy education curriculum into existing academic offerings.</p>		
<p>Other</p>	<ol style="list-style-type: none"> 1. Conduct Green Campus activities successfully. 2. Work together effectively as a team. 	

* Indicates that only one intern from each university where a program occurred reported participating in it.

+ Indicates that only one intern from one of the universities where the program occurred reported participating in it.





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GREEN SCHOOLS SURVEY INSTRUMENTS

INTERVIEW GUIDE FOR EDISON EARTH EDUCATION AND TRAINING PROGRAM MANAGERS

1. To start with, can you tell me the names of all of the programs you are responsible for?
 - a. And how long have you been in this role?
 - b. Please give me a summary of your responsibilities for the EARTH program.
 - c. Can you give me an example of the typical day-to-day issues you deal with?
 - d. Who else supports you for this program and, briefly, what are their responsibilities?

2. Edison has renewed/is renewing contracts with the EARTH program contractors.
 - a. What were the main changes and the reasons for them that had to be worked out for each sub-program (LW, GS, GC)?
 - b. Do you foresee that any of these changes will be a “stretch” for the contractors?
 - c. Were there any program changes that you wanted that the time wasn’t ripe for and so aren’t addressed in the new contracts? If so, what was the rationale for these changes and what obstacles were you facing in getting them adopted?

3. What are some of the major changes you are negotiating with the program implementers for the '09-'11 program cycle and the rationale for these changes?
 - a. I understand the EARTH program will be purely educational and no longer considered a resource program. Do you foresee any changes to the LivingWise kits? [If yes:] What is the rationale for the anticipated changes?
 - b. What are the implications for your plan to demonstrate their value from a measurement point of view?
 - c. Are there any administrative or management changes associated with the program moving from a resource program to an information program, or will



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the change largely be in the perspective and objectives you bring to the management of the program?

- d. Will the EARTH program be linked in any way to other Edison Workforce Education and Training or Marketing, Education and Outreach programs?
4. Let me review with you a synopsis of former program recommendations relating to monitoring program performance to see if you have any specific comments on the status for the current program cycle. For Green Campus, recommendations included:
- a. “GC staff should work to develop a set of progress indicators that can be tracked and reported.” (evaluation report identifies progress indicators tracked per campus but not analyzing for implications across campuses on best implementation activities: # participating, # aware, # influenced, # types of approaches, changes in campus policies)
 - b. “Interns should incorporate beginning and end-of-year surveys with a reasonable (n>200) sample of students to monitor progress.”
 - c. “Purchase additional meters.” Building level and plug load.
 - d. “Monitor behavior changes at the appliance level” (purchase and use)
 - e. “An evaluation system needs to be developed for student interns.”
 - f. Importance of intern coordinator—more time, few interns per coordinator, high caliber coordinator
 - g. Interns set benchmarks before starting new activity, report success and failures in newsletters, enter data into on-line database
 - h. Identify success elements for kWh savings and implement these at other campuses
5. For Green Schools:
- a. Increase the % of schools submitting monthly or quarterly report on program actions taken. Focus only on activities of greatest energy impact and easily quantifiable savings, and only program-induced actions.
 - b. Establish on-site point of contact at each school to update school characteristics used in impacts modeling.



- c. Placing emphasis on how the energy-efficiency training and audit training were conducted would provide useful info that might increase effectiveness in later years.
 - d. Ensure tracking of behavioral changes is generating quality data.
 - e. Conduct early review of processes for light bulb exchange to determine effectiveness of CFLs and data collection process.
6. For LivingWise:
 - a. Recommendation was to have a longer teacher survey. (Fact: Program has a shorter one.)
7. I've seen the monthly status reports prepared for all three programs. Do the programs provide Edison with any other performance reports? [If yes:] What?
 - a. Have you negotiated with the contractors the form their reporting should take? [If yes:] How well are they meeting your requests?
 - b. The GS and GC reports provide a narrative of accomplishments and activities by school. What kinds of information would you like to see reported on an aggregate basis for all participating schools/campuses for each respective program?
 - c. For LW, what reports, if any, do you see that presents and analyzes the survey data RAP collects from students and teachers?
 - i. Which measures have the lowest installation rates and how do these installation rates compare with the measures that have the highest installation rates?
 - ii. Do the reports you receive from RAP summarize this, or have you learned this from some other source, such as prior impact evaluations?
8. I want to understand the EARTH Education and Training Program in terms of the broader Edison context. So let me explore a bit the regulatory requirements, Edison's program portfolio, and the shareholder incentive pressures for the current program cycle and the next program cycle.
9. [*Portfolio*] Please tell me how the EARTH Education and Training Program fits into Edison's program portfolio for the current '06-'08 program cycle and how will that change for the next program cycle?



10. [CPUC '06-'08] What is your understanding of the regulatory expectations for the program for 2006-2008?
 - a. Given these expectations, what are your main concerns for each of the programs (specific to CPUC requirements) for the remainder of the current program cycle?
 - b. How does the context of shareholder incentives influence your concerns as a program manager for the '06-'08 cycle? [probe for LW, GS, GC]
 - c. Is there any feedback that might come from the impact evaluations that you anticipate will be particularly useful to you for managing the program through the end of the current program cycle?

11. [CPUC '09-'11] What will be the regulatory expectations for the program for 2009-2011?
 - a. Given these expectations, what are your main concerns for each of the programs (specific to CPUC requirements) for the next program cycle?
 - b. How does the context of shareholder incentives influence your concerns as a program manager for the '09-'11 cycle? [probe for LW, GS, GC]

12. We've discussed the program from both a regulatory and portfolio perspective. Does Edison have any additional expectations for the program going forward?

13. What reporting do you currently do on the programs? (metrics, summaries)
 - a. Does this reporting have any implications for the portfolio reporting?
 - b. Will the new contracts specify information that needs to be reported by the contractors that hasn't been previously reported?
 - c. Are there any best practices from Edison's other education programs that you have considered for adoption for the EARTH programs moving forward?

14. Are there any interactions, networking, or hand-off between the EARTH program components and Edison's other efficiency programs?
 - a. The Green Schools and Green Campus programs conduct audits. Are these audits coordinated in any way with Edison's nonresidential audit and incentive programs?



- b. The LivingWise program addresses home energy use. Is it coordinated in any way with Edison's residential audit and incentive programs?
 - c. Are there any barriers to increased coordination between EARTH and other Edison programs?
15. Have there been any financial or budgeting issues associated with any of the subprograms?
16. [Ask of Program Manager only] The Alliance to Save Energy uses subcontractors to help deliver its programs. Can you please comment on the effectiveness of the subcontractor staff in carrying out their roles and whether there are any problems that need to be addressed? [by program]
17. What do you feel are the program's greatest accomplishments and strengths? [probe for each of the 3 subprograms]
18. What do you feel are the program's greatest challenges? [probe for each of the 3 subprograms]
19. Any final comments you would like to offer that will help me understand your perspective on the program and its goals and accomplishments?
20. [Program Manager only—explore his preference for terminology to be used in report in discussing the two groups of interviewed Green Schools]



INTERVIEW GUIDE FOR IMPLEMENTATION CONTRACTOR TEAM MANAGER

1. When did the Alliance first conduct Green Schools in Edison's territory?
2. Has the Alliance involved a professional educator as a consultant to contribute to the development of Green Schools or Green Campus educational materials?
3. For Green Schools, you are being asked to have more first-year schools each year, and have fewer second-year schools. How will this change how you deliver the program and work with the schools? What do you think are the advantages and disadvantages of such an approach?
4. Can you comment on the audit portion of Green Schools and its successes and limitations?
5. Has it worked to have Green Campus students assist Green Schools high school students in conducting small business audits? (goal was 250 per year)
6. What connection does the Green Campus and Green Schools audit activities have w Edison's programs, if any? Is there any interaction between any aspect of GC/GS and any Edison program?
7. Does the Alliance solicit feedback from Green Schools teachers on the initial training session? If so, what are examples of feedback you have received in the past and how have you responded to that, if at all?
8. Do you have numerical goals for either the Green Schools or Green Campus programs? If so, what are they? Has it been determined yet what the goals will be for the '09-'11 cycle? If so, what?
9. The 2004-2005 evaluation noted that a form had been drafted by the Alliance that would track what are the actual behavior changes occurring at Green Schools and when they are taking place? Does that sound consistent with your understanding and, if so, can you tell me the status of that? Is it being used? Who completes it? How does the Alliance use the information?



10. Does the Alliance use the Green Campus Action Plans to create goals for each campus that the Alliance then tracks throughout the year?
11. What does the Alliance do to promulgate best practices among participating Green Schools? Green Campus?
12. How is the current program reporting processes—monthly reporting to Edison on Green Schools and Green Campus—going from your perspective?
13. What collaboration have you done with Edison on content and format of program reporting?
14. Going forward, Edison needs to demonstrate to its stakeholders two key things for its education programs: (1) effectiveness and (2) continuous improvement. I'd like to discuss each of these for each of the two programs, and get your ideas on how the Alliance can best demonstrate these. Let's first take continuous improvement and Green Schools. Do you have a process in place for identifying ways the Green Schools program can improve? What? Does this process lend itself to developing annual performance indicators re continuous improvement activities? [If not:] What might work?
15. Do you have a process in place for identifying ways the Green Campus program can improve? What? Does this process lend itself to developing annual performance indicators re continuous improvement activities? [If not:] What might work?
16. Now let's tackle effectiveness. Do the current program processes for Green Schools lend themselves to identifying effectiveness indicators, such as based on the Schools' plans or activities? [If not:] What might work?
17. Do the current program processes for Green Campus lend themselves to identifying effectiveness indicators, such as based on the Schools' plans or activities? [If not:] What might work?
18. In summary, what do you believe to be each programs' strengths that are unique and impactful? Why do you say so?
19. In taking the program to the next level of development, what would you like to focus on for the next program cycle?
20. What type of support would you like to see from Edison to accomplish this?



21. Is there anything else you think we should know so we can support your efforts to improve the program?



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INTERVIEW GUIDE FOR LOCAL PROJECT LEADERS

Introduction

Thank you for your willingness to be interviewed. The purpose of the evaluation is to provide feedback to help the program team continually improve the program. Your responses will not be attributed to you or used in a way that can identify you.

Overview

1. In thinking about the most recent program years (2006-08), what would you say are your greatest success stories thus far, or the accomplishments you are most proud of?
2. What challenges are you encountering?
Have you had to revise your approach? If so in what ways?
3. Are there any aspects of the program that are still evolving? [Probe what and any associated timeframes]

Participation Process

4. How do district staff typically learn about the program opportunity?
 - a. How about individual principals? How do they typically learn about the program?
 - b. And individual teachers? How do they typically learn about the program?
 - c. Please walk me through the process for participants once they agree to take part in the program. [Identify typical process and support provided by program staff – may only need to ask this question of one person for each program.] Please address all types of participants: districts, schools, teachers, students, other school staff, community members.

Program Materials and Training

5. What training do you provide to participants?



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6. How do you assess whether or not the level of training provided meets participant needs? (Given that their current resources, circumstances, motivation, awareness and knowledge may be at different places in the beginning? – see question below)
7. Is training tailored at all given the different circumstances that might be present at different districts, schools or among teaching staff?
8. If so, how does this occur?
9. What is the difference between services given to schools in their second year with the program versus first year?
10. Currently, would you say the program is working better for some grades than others? If so, which ones, and any theories on why?
11. Are you currently developing or planning new materials? If yes, what?

Learning Objectives

12. Are there formal or written learning objectives? What are they?
13. What specifically are examples of the knowledge, attitude, and behavior changes you hope are achieved with the program?
14. What mechanism or process is in place to assure that the learning objectives are aligned with state standards?
 - a. How do you assess changes in participants' knowledge, attitudes or behaviors?
 - b. What opportunities are there for you to be able to compare goals to outcomes as a means of assessing changes in knowledge, attitudes, and behaviors?
15. The 2004-2005 evaluation noted that a form had been drafted by ASE that would track what are the actual behavioral changes occurring at the schools and when are they taking place. Is this form being used? If so who completes it? Could we have a copy of it? If so, can we see the data resulting from this form?



16. The Green Schools program serves K-12 students. Have differences in learning objectives for the different age levels been articulated?

Program Accomplishments

17. What mechanisms do you have in place for getting satisfaction feedback and recommendations from participants?
18. How do you learn of and track program activities? Participants?
19. Since the program offers a lot of flexibility for school teams to decide on what activities to implement at their school, how do you track program activities occurring at each school? Are they tracked by student age?
20. Are the results of program-related activities publicized throughout the school community?
- a. How is the publication “Students Leading the Way Energy Saving Success Stories from Southern California” developed/disseminated/used?
21. What portion of participating districts return part of the energy savings to the schools?
22. How important is the potential funding to participating schools? Is it a big motivator?
23. Do you establish a participation agreement with the district as well as the school that describes how the energy savings are to be returned to the individual schools?
24. What is the process Districts typically use for paying the schools some of these savings?
25. What have you heard about the processes for assessing/paying schools for their energy savings? How does it seem to be working for the Districts? The schools?
26. What are your processes around building audits? Do you track the number of school building audits conducted? [A prior evaluation made a recommendation on this point] How about the number of nonschool building audits (e.g., small businesses)? Do you have numerical goals established for either type of audit?
- (Processes to address: (1) training of auditor & auditor exam, (2) QC review of audit [prior evaluation recommended: audit recommendations should be reviewed by a PE prior to being presented to School Board], (3) presenting audit results to decision maker,



(4) follow up with decision maker to encourage implementation, (5) maintaining copy of audit report, (6) interface with SCE's audit program or hand off to SCE incentive program marketing efforts)

Variations by Schools

27. What do you think are the differences between the schools that use the program very effectively and those that do not?
28. Is there any kind of assessment (for example measuring capacity or commitment) done early on to identify the strengths and/or potential barriers to implementing the program at a given school or district?
29. Can you estimate the proportion of participating schools that serve lower socio-economic groups (e.g., greater than 70% free and reduced lunch)? Do you have plans to increase participation by these schools?

Prior GS Evaluation Recommendations

30. Review of past evaluations identified several issues related to how all the potential variables are tracked:
 - a. One evaluation noted that monthly reports from sub-contractors would provide information to ASE about any changes. Trying to avoid over-burdening teachers/schools – improved school reporting “should concentrate only on those changes created by the Program and the activities which generate the greatest energy impact and are easily quantifiable.” Is this being done? What changes and activities are tracked?
 - b. How are the number of recommendations made to participating schools tracked? Is there a list of the no-cost behavioral recommendations?
 - c. Is the number of no-cost energy improvements actually adopted tracked? How? [One evaluation recommended that ASE do more to track the specific recommendations made to schools, the basis for the recommendations, and the number of recommendations implemented in order to better document the full impacts of the program.]
 - d. Are the number of student participants tracked? How?



- e. How does ASE assess the content or effectiveness of the training provided to school staff? (pre- post-tests?)
- f. How does the program track the extent to which teachers use energy education materials in the classroom?
- g. How does ASE assess the content or effectiveness of the curriculum/ materials? (pre- post tests?)
- h. Is there a method by which ASE obtains and incorporates feedback to improve curriculum?
- i. How does ASE measure the educational impacts (knowledge gains and attitudinal changes) with respect to energy efficiency? (pre-test post-test)

Summary

- 31. In summary, what do you believe to be the program's strengths that are unique and impactful? Why do you say so?
- 32. In taking the program to the next level of development, what would you like to focus on for the next program cycle?
 - a. What type of support would you like to see from Edison to accomplish this?
- 33. Is there anything else that you think we should know so we can support your efforts to improve the program?

Thank you for your time.



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INTERVIEW GUIDE FOR GREEN TEAM (SCHOOL) MEMBERS

Thank you for agreeing to me to talk about your experiences with the Green Schools Program. We have been hired by Southern California Edison to conduct these interviews as part of their continuous improvement efforts. Your feedback will help the program become more effective. Your comments will be held in confidence by our research team. No one in your school, in the Green Schools program, or at Edison will be able to identify or infer what you have said.

Let's get started.

1. How would you describe the Green Schools Program to someone who has never heard of it before?
2. Have your experiences with Green Schools met your expectations?
3. What aspects of Green Schools have you been most satisfied with or pleased with?
4. What aspects have you found least satisfactory?
5. Looking back, what do you think contributed to the success of the positive experiences you mentioned?
6. What do you think led to some things being less than satisfactory?
7. What's your assessment of the Green Schools lesson plans and teaching materials? How well do they fit your needs?
8. What are the key behavioral changes Green Schools promotes?
9. If a colleague at another school, say in another district, told you he or she was contemplating getting involved with Green Schools, what advice would you give?
 - a. What do you see as key requirements for successfully implementing this program that you would recommend to another school that is evaluating whether to participate in the program?
 - b. (Alternatively) Are there any "make it or break it" factors that you would advise them to consider before committing to participate?



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10. What might the Green Schools program staff or Edison do to better serve schools like yours?
11. Who else has had involvement with Green Schools that I might try and speak with?

Probes:

12. Was your school/ district already interested in energy conservation before you had an opportunity to participate in the Green Schools program?
13. Support from principal, other teachers, facility staff, other staff.
 - a. Is there a champion?
 - b. How strong is the team?
14. Support from district, including reimbursement of energy cost savings. How does reimbursement affect motivation?
15. Response of (students, if not stated) families and community.
16. How do you know when a Green Schools activity has been successful?
17. Will you continue any of the Green Schools activities and teachings next year?
18. How do you track progress toward your goals for the program?
 - a. Would it be helpful for Green Schools staff to help you document your progress toward goals, such as providing you at the beginning of the year with a scorecard with the goals you established?



PROCESS EVALUATION QUESTIONS INCLUDED ON THE GREEN SCHOOLS IMPACT EVALUATION SURVEY OF TEACHERS

1. Did you run into any problems teaching the Green Schools information?
 1. Yes
 - a. What were they?
 - b. How were they addressed or what suggestions do you have?
 2. No
 - 8. Don't know
 - 9. Refused
2. How satisfied are you with the Green Schools program? Please use a 0 to 10 scale, where 0 is not at all satisfied and 10 is extremely satisfied.
 1. Record 0 to 10 scale
 - 8. Don't Know
 - 9. Refused
3. Is there anything the Green Schools program might do to be more successful in classrooms like yours?
 3. Yes
 - a. What might the Green Schools program do?
 4. No
 5. Don't know
 6. Refused
4. Do you have any final comments you'd like the program sponsors to hear?
[Open Ended Response]



PROCESS EVALUATION QUESTIONS INCLUDED ON THE GREEN SCHOOLS IMPACT EVALUATION SURVEY OF DECISION-MAKERS (PRINCIPALS / SUPERINTENDENTS)

1. Is there anything that would make it difficult to use the Green Schools Program in other classrooms in your school/district? {prompt with information from prior discussion if needed}
 1. Yes
 - a. What?
 2. No
 - 8. Don't know
 - 9. Refused

2. How satisfied are you with the Green Schools Program? Please use a 0 to 10 scale, where 0 is not at all satisfied and 10 is extremely satisfied.

[0-10 Response]

 - 8. Don't Know
 - 9. Refused

3. And using the same 0 to 10 scale, how would you describe the enthusiasm of the school community overall for the Green Schools Program?

[0-10 Response]

 - 8. Don't Know
 - 9. Refused

4. Is there anything the Green Schools Program might do to be more successful in schools?

[Open Ended Response]



5. Do you have any final comments you'd like the program sponsors to hear?

[Open Ended Response]



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PROCESS EVALUATION QUESTIONS INCLUDED ON THE GREEN SCHOOLS IMPACT EVALUATION SURVEY OF CUSTODIANS

1. To what extent did the Green Schools Program meet your expectations? Please use a 0 to 10 scale, where 0 is did not meet your expectations at all , 10 is greatly exceeded your expectations, and 5 is generally met your expectations.
 1. Record 0 to 10 score
 - 8. Don't Know
 - 9. Refused

2. To what extent did you feel supported by the Green Schools program representative? Please use a 0 to 10 scale, where 0 is did feel supported at all, 10 is felt highly supported, and 5 is the support is generally adequate.
 1. Record 0 to 10 score
 - 8. Don't Know
 - 9. Refused

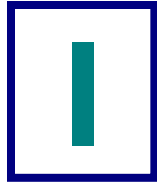
3. What could Green Schools have done better ?
[Open Ended Response]

4. Did your run into any problems incorporating this program at your school? {prompt with information from prior discussion if needed}
 1. No
 2. Yes
 - a. What were they?
 - b. How were they addressed or what suggestions do you have?
 - 8. Don't know
 - 9. Refused



5. Is there anything the Green Schools Program might do to be more successful at schools like yours?
1. Yes
 - a. What?
 2. No
 - 8. Don't know
 - 9. Refused
6. Do you have any final comments you'd like the program sponsors to hear?
[Open Ended Response]





LIVINGWISE[®] SURVEY INSTRUMENTS

INTERVIEW GUIDE FOR EDISON EARTH EDUCATION AND TRAINING PROGRAM MANAGERS

See *Appendix H: Green Schools Survey Instruments*. Since the Edison EARTH Schools manager and his supervisor oversee multiple programs, these individuals responded to a single interview guide, which included questions related to all three programs.



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LIVINGWISE PROGRAM IMPLEMENTATION STAFF INTERVIEW GUIDE

1. Please describe your current role with the program and how it has changed, if at all, with the 2006-2008 program cycle.
2. What is your long-term vision for penetrating the schools market in Edison's service territory?
 - a. For example, do you have a plan for reaching a certain percentage of schools over a given period of time?
 - b. How many teachers can you support at one time?
3. What program processes are in place to ensure that the LivingWise curriculum is in alignment with California curriculum standards?
4. Currently the SCE program is not receiving reporting on data from the teacher survey from RAP.
 - a. What kind of analysis is being conducted with the data to identify teacher satisfaction with the program?
 - b. Have you identified areas in need of improvement from the teacher survey results, and if so, can you share the most important ones with me?
 - c. What additional questions could be added to the teacher survey to add to your knowledge on what is working well in the classroom and what aspects of the program need to be improved?
5. Knowledge transfer between the school and home is a key objective of the program.
 - a. What do you think are the determinants of parent involvement in the program?
 - b. Probe if not mentioned: For example, do you think any of the following are relevant: parent knowledge of energy conservation prior to their child's participation in the program; education level of parents; English language proficiency of parents; household income; parent motivation to save on energy costs.



6. In a similar school program in Wisconsin, researchers conducted an in-depth student-parent survey to measure interaction effects between school and home on program outcomes. Researchers administered a 12 page survey to the students in the classroom, while students were asked to provide the questionnaire to their parents to complete.
 - a. Do you think it would be feasible for a researcher to recruit a sample of teachers willing to support a similar research effort for the schools in your program?
 - b. Do you think teachers would be willing to take the role of handing out and collecting the completed questionnaires from the students?
 - c. Do you think students can be counted on to provide the questionnaire to their parents or would the researcher need to come up with a plan for reaching the parents independently of the students?
 - d. Would parents require some incentive for participating?
 - e. Any other thoughts on doing such research?

7. In assessing measure installation rates from your survey data, do some measures have low installation rates, and if so, what are they, and what do you think are the key barriers to improving these rates?
 - a. Can you obtain school demographic data to assess whether measure installation rates vary by average household income at the school level?
 - b. Have you taken steps or plan to take steps to improve installation rates for these measures, and if so, what are they, and how are things progressing in this area?

8. Currently SCE only receives program data which is aggregated for all the participating schools. Have you been able to analyze program data including survey findings at the school level to determine whether there are differences in school performance within the program?
 - a. If so, what do you think are the barriers to higher performance for schools that are lagging?
 - b. What do you think contributes to higher performing schools that could be translated into ‘best practice’ that could be applied as “lessons learned” for the lower performing schools?



9. With regards to the aggregated program and survey data that you provide to SCE, they currently receive data files without an interpretive narrative. Is it possible to do some analysis with the data and provide an interpretive narrative with “actionable insights”?
10. What processes do you have in place to support a “continuous process improvement” approach to managing the LivingWise program for Edison?
 - a. Is it feasible for you to communicate the opportunities for improvement that you identify to Edison in your monthly management report to them?
11. For the next program cycle, the LivingWise program will no longer be considered a resource program based on energy savings goals so the emphasis on metrics related to changes in knowledge and attitudes will be much greater. How do you plan to address that in your program planning for the '09-'11 program cycle?
 - a. Probe on thoughts about changes to the program curriculum, and program tracking data such as the survey questionnaires.
12. Is there anything else that you think we should know so we can support your efforts to improve the program?

Thank you for your time.



LIVINGWISE TEACHER INTERVIEW GUIDE

Thank you for agreeing to talk with us about your experiences with the LivingWise Program. We have been hired by Southern California Edison to conduct teacher interviews as part of their continuous improvement efforts. The Edison program management team is interested in understanding how well the students are reacting to the program, what their enthusiasm level is, and how this carries over to the home. Your feedback will help the program become more effective, and your comments will be held in confidence by our research team. No one in your school, in the Living Wise program, or at Edison will be able to identify or infer what you have said.

Let's get started.

First, I'd like to ask you a few questions about the quality of classroom teaching materials that you were provided through the Living Wise program:

1. How well do you think the LivingWise program provided quality content that supported your standards-based teaching curriculum as required by the State of California?
 - a. Did the program curriculum and materials meet your expectations for quality?
 - b. Are any changes needed to improve the fit between the LW curriculum and the mandated curriculum?
2. How easy or challenging was it to use the LW curriculum in the classroom?
3. From the “teacher” perspective, in what ways was the LivingWise Program successful with your students during classroom time?
4. Which aspects of the LW curriculum did students report that they liked the most? For example, what aspects of the program seemed to engage or motivate them the most?
 - a. Is there anything that they disliked or found difficult to comprehend?
5. Did the program continue to keep students motivated and interested in the subject matter? If so, in what ways? If not, why?
 - a. Are there any suggestions you have for modifying the program to enhance your student's level of motivation and interest?



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Now I'd like to ask you a few questions on the use of the Living Wise kits by your students in their homes:

6. What can you tell us about the kind of learning that occurred at home, within the family, as students worked with parents to install energy saving measures provided in the kit? For example, what stories did your students or parents tell about their family conversations and experiences as they installed the measures in the LW kit (e.g., low flow shower heads or CFL bulbs)?
7. Based on the communications you had with parents and their children who participated in the program this past year, do you think your students' participation in the program has led to new sources of knowledge and behavior about energy efficiency in the home? Can you provide some examples that might suggest that students are helping parents and other family members learn about ways to save energy and reduce energy costs when they use the kits at home?
8. Overall, do you think the students in the program found the kit to be a useful learning tool?
 - a. Was there anything about the kit that students found difficult to use?
 - b. Were some families hampered in their ability to install items in the kit because they are renters and might need landlord approval, or because they don't have the right tools or other obstacles such as possible language barriers. Have you heard anything that sheds light on the significance of these possible limiting factors?
9. In what way do you think the Living Wise program could improve communications between the school, students, and parents, with regards to the purpose of the kit, for the LW program to be more effective?
10. Based on your experience in the program, do you think the home exercises encourage families to continue to learn about and pursue additional energy conservation and cost savings measures beyond the items in the LW kit? Do you have any specific examples to share?

Now I'd like to ask you a few questions about the sources of motivation for energy conservation that were most effective for your students while you worked with the program in the classroom:



11. Do you think your students were motivated to save energy as a way to save the environment, to save on household expenses, or both? Do you think one or the other were more important or equally important in motivating students?
 - a. Do you have any suggestions or recommendations for how LW might communicate each of these messages even more effectively for students in your school?

12. Given your experience with the Living Wise program we are interested in any ideas, comments, questions, or recommendations you might have to enhance the program's impact on student, family, and community implementation.

Thank you for your time.....closing comments.



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PROCESS EVALUATION QUESTIONS INCLUDED ON THE LIVINGWISE IMPACT EVALUATION SURVEY FOR PRINCIPALS

1. Is there anything about the LivingWise® program that makes it inappropriate for most sixth grade classrooms? {prompt with information from prior discussion if needed}
 1. Yes
 - a. What about the LivingWise® program makes it inappropriate?
 2. No
 - 8. Don't know
 - 9. Refused
2. How satisfied are you with the LivingWise® program? Please use a 0 to 10 scale, where 0 is not at all satisfied and 10 is extremely satisfied.
 1. Record 0 to 10 Response
 - 8. Don't Know
 - 9. Refused
3. Is there anything the LivingWise® Program might do to be more successful in classrooms in your school/district?
 1. Yes
 - a. What might the LivingWise® program do?
 2. No
 - 8. Don't know
 - 9. Refused
4. Do you have any final comments you'd like the program sponsors to hear?
[Open Ended Response]



**PROCESS EVALUATION QUESTIONS INCLUDED ON THE LIVINGWISE
IMPACT EVALUATION SURVEY OF TEACHERS**

1. Did you run into any problems in teaching the LivingWise® Program?
 1. Yes
 - a. What were they?
 - b. How were they addressed or what suggestions do you have?
 2. No
 - 8. Don't know
 - 9. Refused

2. How satisfied are you with the LivingWise® program? Please use a 0 to 10 scale, where 0 is not at all satisfied and 10 is extremely satisfied.
 1. Record 0 to 10 Response
 - 8. Don't Know
 - 9. Refused

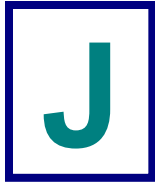
3. Is there anything the LivingWise® Program might do to be more successful in classrooms like yours?
 - a. Yes
 - i. What might the LivingWise® program do?
 - b. No
 - c. Don't know
 - d. Refused

4. Do you have any final comments you'd like the program sponsors to hear?
[Open Ended Response]





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GREEN CAMPUS SURVEY INSTRUMENTS

INTERVIEW GUIDE FOR EDISON EARTH EDUCATION AND TRAINING PROGRAM MANAGERS

See Appendix H: Green Schools Survey Instruments. Since the Edison EARTH Schools manager and his supervisor oversee multiple programs, these individuals responded to a single interview guide, which included questions related to all three programs.

INTERVIEW GUIDE FOR IMPLEMENTATION CONTRACTOR TEAM MANAGER

See Appendix H: Green Schools Survey Instruments. The implementation contractor's team manager oversees both the Green Schools and the Green Campus programs. As a result, she responded to a single interview guide, covering both programs.



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GREEN CAMPUS PROGRAM IMPLEMENTATION STAFF INTERVIEW GUIDE

Introduction

Thank you for your willingness to be interviewed. The purpose of the evaluation is to provide feedback to help the program team continually improve the program. Your responses will not be attributed to you or used in a way that can identify you.

Overview

1. Please describe your current role with the program and how it has changed with the 2006-08 program cycle.
2. Has the Alliance changed any facet of the program during the current program cycle? [Consider organizational structure, roles, processes, and activities.] [If yes] What and why?
 - a. Were any of these changes based on recommendations from a prior evaluation? [If yes] What?
3. How are Green Campus interns recruited and what qualifications do you seek?
 - a. Have you found that the number of interns at each campus influences the results that campus attains? [If yes:] In what ways? Is there a minimum number of interns necessary to have a successful campus group?
 - b. What processes do you have in place to the transition from one intern to the next such as when an intern graduates? [probes: mentoring, documents maintained and delivered]
 - c. How does Green Campus involve the RAs (residence assistants), if at all?
 - i. Do you think RAs might constitute an underutilized resource for attaining program objectives?
4. What is the title of the program staff person that coordinates the interns?
 - a. Have the interns and their coordinators been able to work together well to move forward and solve problems on a timely basis? Can you give me examples that support your assessment?



- b. How frequently does the supervisor for the intern coordinator get called in problem solve?
- c. As you reflect on the past school year, what opportunities do you see for enhancing these relationships between interns, their coordinators, and the supervisor?

Campus Advisory Committees

5. Who recruits the members of the stakeholder advisory committee and how are they recruited?
6. How do you find “champions” for Green Campus to be on the advisory committee
 - a. And would you say there is at least one champion on every committee?
7. Are specific types/ roles of individuals sought, such as an engineering professor or the director of facilities)?
8. Does the Alliance take any steps to encourage campus energy managers or facility staff to serve on the stakeholder advisory committee or perhaps to work with the interns in some other capacity?
 - a. [If yes] What?
 - b. And do Alliance staff directly interact with or provide any direct support to energy managers or facility staff?
9. Do Alliance staff directly interact with or provide any direct support to the stakeholder advisory committee members?
10. How do you assess the extent to which the stakeholder advisory committee is fulfilling its role as advisors to the interns?
11. Does the stakeholder advisory committee produce any documentation of its activities, such as who was in attendance, items discussed, tasks identified or assigned? [If yes:] What?
12. How do the interns convene meetings with the stakeholder advisory committee for the program on their campus? Does it vary by campus?



- a. How do you become aware of when the meetings are held?
13. Is it your expectation that every intern is aware of the stakeholder advisory committee for the program at that campus?
 - a. Is the committee known to interns by any other names?
 - b. Our web survey of interns found that half of the interns (6 of 12 respondents) reported they “did not know” whether a stakeholder advisory committee had been established at their campus. Can you help me understand what the reasons for this could be?

Action Plans and Plan Success Indicators

14. In what format is the information in the Action Plans reported to Edison, if at all?
15. Do teams sometimes undertake activities that are not in their Action Plans? [If yes] Can you provide some examples?
16. Are there times when the teams don't undertake all the activities in their Action Plans? [If yes] Can you explain the circumstances that lead to this?
17. I've seen the Green Campus Intern Handbook and the Action Plan Template. In addition to these materials, do Alliance staff provide any direct assistance in the development of a campus Action Plan? [If yes] What?
 - a. [If not evident:] Do Alliance staff provide any direct assistance in the development of the “success indicators/metrics” that the template calls for? [If yes] What?
18. In addition to the Handbook and Template, do the interns receive training in creating a measurement system for monitoring and reporting on program performance throughout the year?
19. Do you review the indicators to see how satisfactory they are?
 - a. Do you consult with Edison staff to get consensus on the indicators?



20. How easy has it been for the teams to develop suitable success indicators/metrics? What proportion of the teams has been able to develop Actions Plans that specify suitable performance metrics?
- How do you work with teams that are falling short in the collection and reporting on performance indicators?
 - Do you step in to “fill the gap” and create the specified reporting?
 - [As warranted by prior answers:] Given the success indicators/metrics the teams propose, does it appear the support the interns receive in this areas is sufficient? [If not] What are next steps or barriers to moving forward?

Strategic Planning

21. Does the Alliance facilitate the strategic planning meetings or have direct involvement in them?
22. Do you encourage the people involved in the strategic planning process to reflect on the group process and identify how to get the most out of future strategic planning sessions? [If yes] How do you encourage or facilitate this?

Program Training

23. I understand the Green Campus program builds interns’ skills and capabilities through a number of avenues. Things that come to my mind are the Energy Primer, the Intern Orientation Guide, the Intern Handbook, the End of Year Sustainability Conference and Student Convergence, the Project Spaces website. Have you identified any additional training or expanded training that interns would benefit from?
- [If yes] What are your plans for additional training?
24. How do you assess the extent to which each of these activities and materials meets intern and campus needs?
- Do you get any feedback from interns or other participants on these activities and materials?
25. Does the Alliance assess intern performance in any way?
- What do you do if you think an intern is underperforming for hours charged?



26. Has the Alliance involved a professional educator in developing any of the training materials for Green Campus, or in developing the Energy 101 or other didactic elements of the program?
- a. [If yes] In what capacity? For what materials? Anything else?

Measurability and Reporting

27. For what percent of their activities, or at what intervals, are interns reporting on the success indicators/metrics specified in the Action Plans?
28. How are these reports used by the Alliance to assess progress towards goals?
29. Findings from the last process evaluation suggested that progress indicators are tracked per campus but not analyzed for implications across campuses on best implementation activities. What steps does the Alliance take to identify best practices across campuses—those elements that lead to success?
- a. What does the Alliance do to alert interns about best practices?
- b. And the converse—how do the different intern teams learn from each others' disappointments?
- c. How is this working? How might you improve on this area?
30. Are there additional performance indicators the Alliance uses to assess the Green Campus program as a whole (not just performance at a single campus) and whether the program is performing as expected?
31. Edison is needing to demonstrate to its stake-holders two key things for its education programs: (1) effectiveness and (2) continuous improvement. How do you think the Alliance can best demonstrate these on an ongoing basis for Green Campus?
32. What collaboration have you done with Edison on content and format of program reporting?
- a. I've seen the monthly reports that provide a narrative description of activities by campus. It's hard for me to see the "take-away" point. Have you discussed with Edison providing a status report that assesses accomplishments toward goals for the program as a whole?



33. The last evaluation report for this program recommended that “GC staff should work to develop a set of progress indicators that can be tracked and reported.” Can you provide me with your response to the following recommendations related to program performance monitoring:
- a. Track: # participating, # aware, # influenced, # types of approaches, changes in campus policies
 - b. “Interns should incorporate beginning and end-of-year surveys with a reasonable (n>200) sample of students to monitor progress.”
 - c. “Purchase additional meters.” Building level and plug load.
 - d. “Monitor behavior changes at the appliance level” (purchase and use)
 - e. “An evaluation system needs to be developed for student interns.”
 - f. Train interns in measurement, “including principles of baseline, control groups, and measuring...behavioral and attitudinal impacts” and on “sample sizes, focus groups”

Alliance Assessment of Green Campus

34. What challenges does the program currently face and, if any, what changes are being contemplated to address these challenges?
- a. What processes do you have in place to identify areas for improvement?
35. What do you think are the differences between the campuses that use the GC program very effectively and those that do not?
36. Can you give me specific examples of the knowledge, attitude, and behavior changes you hope are achieved with the program? [probe by type of participant—intern, student, faculty, facilities staff, admin]
37. How does the Alliance assess how well the Green Campus program is performing overall in terms of its mission to affect changes in participants’ knowledge, attitudes or behaviors?
- a. What additional opportunities are there for you to be able to compare GC program goals with outcomes?



- b. Might the teams be able to distribute at events the type of “how are we doing” cards that are so common these days?

Past Program Evaluation Recommendations

38. Can you provide me with your responses to the following program recommendations that came out of the last evaluation for this program?:
 - a. Increase campus facility manager involvement;
 - b. expand Energy 101 to additional campuses;
 - c. communicate in summer w incoming freshmen;
 - d. acquire a room on campus for program participant meetings;
 - e. coordinate with other environmental groups;
 - f. develop a long-range plan for funding and sustainability

Audits

39. What are your processes around building audits? Specifically, what are the steps involved in:
 - a. training of auditor & auditor exam;
 - b. Quality control review of audit; presenting audit results to decision maker;
 - c. follow up with decision maker to encourage implementation;
 - d. maintaining copy of audit report;
 - e. interface with Edison’s audit program or hand off to Edison’s incentive program marketing efforts
40. Do you track the number of campus building audits conducted? [A prior evaluation made a recommendation on this point] How about the number of nonschool building audits (e.g., small businesses)?
 - a. Do GC interns partner with GS schools to conduct audits?
 - b. Do you have numerical goals established for any of these types of audits?



41. Do you track the number of no-cost energy improvements which are actually adopted? If so, how? [One evaluation recommended that ASE do more to track the specific recommendations made to campuses, the basis for the recommendations, and the number of recommendations implemented in order to better document the full impacts of the program.]
42. In summary, what do you believe to be the program's strengths that are unique and impactful? Why do you say so?
43. In taking the program to the next level of development, what would you like to focus on for the next program cycle?
 - a. What type of support would you like to see from Edison to accomplish this?
44. Is there anything else that you think we should know so we can support your efforts to improve the program?

Thank you for your time.



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GREEN CAMPUS PROCESS EVALUATION INTERN SURVEY INSTRUMENT

Thank you for participating in this survey. We are seeking feedback on your experiences with the Alliance to Save Energy's Green Campus Program, so that the program might continue to improve. Your comments will remain anonymous, and no one at the Alliance to Save Energy or Southern California Edison--the program's sponsor--will know your individual responses. The survey takes about 15-20 minutes to complete and can be completed at your convenience over the next four weeks (until June 30, 2008).

We will provide all interns that complete a survey with a \$25 Visa gift card.

If you wish to complete it over several sittings, just complete a page, enter it by hitting the "next page" button, then exit the site. Next time, re-enter through the URL given in the email. You will be asked to confirm your email address. Enter it, hit next, and the survey will automatically resume at the first incomplete page.

Should you have any questions or concerns regarding this survey, please do not hesitate to contact Marjorie McRae, a principal investigator of this study, by calling toll free 1-866-395-4644 or by email mmcrae@researchintoaction.com, or contacting Kathy Gumbleton of Southern California Edison at 626-812-7609 or kathleen.a.gumbleton@sce.com, or your Alliance to Save Energy contacts.

If you encountered any technical problems, please contact Jun Suzuki at Research Into Action by calling toll free 1-866-395-4644 or by email jsuzuki@researchintoaction.com.

Thank you again for your participation.
the Research Into Action Team

Contact Information

Your full name _____

Name of the school _____

[Note: signifies 'choose one.' signifies 'choose all that apply.']

Q1: Has a Green Campus stakeholder advisory committee been established for this campus?

- Yes
- No
- Don't know



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[IF Q2=YES, SKIP TO Q6]

Q2: Which of the following groups or individuals were included in the committee? Please check all that apply.

- Student representatives from other campus organizations
- Faculty
- Facility managers
- Energy managers
- Housing directors
- Dining hall directors/managers
- Administration (for example, vice chancellor)
- Other (please specify)

If you selected other, please specify

[Open Ended Response]

Q3: About how many times were you able to meet with your Green Campus Stakeholder Advisory Committee as a group during the 2007/2008 academic year?

- None
- Once
- Twice
- Three or more times

Q4: About how many times were you able to meet with your Green Campus Stakeholder Advisors individually during the 2007/2008 academic year?

- None
- Once
- Twice
- Three times or more

Q5: In this page, we'd first like to ask you to briefly describe in your own words the top 3 goals established for the Green Campus program on your campus for the 2007/2008 academic year. After each goal you describe, you are asked to rate the extent to which you feel it was achieved using a degree of success scale, "high" "medium" or "low".

1st GOAL ESTABLISHED FOR YOUR CAMPUS (Don't be deceived by the small boxes. They can hold as much as you'd like to say!)

[Open Ended Response]



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Q6: The degree of success for this goal?
 High
 Medium
 Low

Q7: 2nd GOAL ESTABLISHED FOR YOUR CAMPUS
[Open Ended Response]

Q8: The degree of success for this goal?
 High
 Medium
 Low

Q9: 3rd GOAL ESTABLISHED FOR YOUR CAMPUS
[Open Ended Response]

Q10: The degree of success for this goal?
 High
 Medium
 Low

Q11: What was your role on the intern team for the Green Campus Program this past year? (for example, lead, treasurer, publicity, etc.)
[Open Ended Response]

Q12: As a Green Campus intern, what projects, activities, and/or events were you involved in this past year?
[Open Ended Response]



Q13: The goals of the Green Campus Program are given in the following list. Thinking of your work with the program, how would you describe each of the goals in terms of “key” “secondary” or “minor” based on the approach your campus took to the program this past year?

	Key	Secondary	Minor	Don't Know /NA
a) Increase awareness of the relationship between energy and the environment among students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Increase awareness of the relationship between energy and the environment among faculty, staff, and administrators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Increase students' actions that save energy on campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Create partnerships among students, faculty, and staff that lead to ongoing energy efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Develop energy education curriculum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Integrate energy education curriculum into existing academic offerings (i.e., through course projects, presentations, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q14: For the same items, please describe the degree of success (high, medium, or low) you feel each goal attained?

	High	Medium	Low	Don't Know/ NA
a) Increase awareness of the relationship between energy and the environment among students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Increase awareness about the relationship between energy and the environment among faculty, staff, and administrators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Increase students' actions that save energy on campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Create partnerships among students, faculty, and staff that lead to ongoing energy efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Develop energy education curriculum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Integrate energy education curriculum into existing academic offerings (i.e., through course projects, presentations, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q15: How receptive were the members of your campus in terms of their interest and willingness to take part in Green Campus activities? Please rate the following items on their interest and willingness to take part using a 5-point scale to where 5=very high and 1=very low.

	1=Very Low	2	3	4	5=Very High	Don't Know/ NA
a) Interest among students generally in Green Campus objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Interest among the faculty generally in Green Campus objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Interest among the building operations staff generally in Green Campus objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Interest among administrative decision makers generally in Green Campus objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Willingness of students to take part in Green Campus activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Willingness of faculty to take part in Green Campus activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Willingness of building operations staff to take part in Green Campus activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Willingness of administrative decision makers to take part in Green Campus activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16: Please use this space to elaborate on your answers to the question above.

[Open Ended Response]



Q17: Please rate the extent to which your expectations for how the program would operate on your campus have been met in the following areas. Please use a 5-point scale where 5=expectations fully met or exceeded and 1=expectations not met at all.

	1= Expectations Not Met At All	2	3	4	5= Expectations Fully Met Or Exceeded	Don't Know/ NA
a) Technical information on energy and conservation provided to you by Green Campus Program staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Information and assistance relevant to your campus provided to you by Green Campus Program staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Timeliness of responses to your questions and requests for information by Green Campus Program staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Assistance other than information provided by Green Campus Program staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Ability to learn from the experiences of other Green Campus universities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Ability to confer with interns at other Green Campus universities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Information available from Green Campus ProjectSpaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Opportunities for career development, including networking events with energy professionals, professional development tutorials, access to job listings, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q18: Please use this space to elaborate on your answers to the question above.

[Open Ended Response]

Q19: Please rate your overall satisfaction working as an intern for the Green Campus program? Please use a 5-point scale where 5=highly satisfied and 1=not at all satisfied.

- 1=not at all satisfied
- 2
- 3
- 4
- 5=highly satisfied

Q20: What are the Green Campus projects, events, and/or other activities from which you derived the greatest satisfaction, and why?

[Open Ended Response]

Q21: What are the Green Campus projects, events, and/or activities which you believe other students who participated in the program appreciated most, and why?

[Open Ended Response]

Q22: What Green Campus projects, events, and/or other activities do you believe were least successful, and why?

[Open Ended Response]

Q23: What are the three or so main factors that make it difficult for your campus to move forward with energy efficiency?

[Open Ended Response]

Q24: Would you be willing to be contacted during the summer by phone to discuss your Green Campus experiences in more detail?

- Yes
- No [SKIP TO Q27]



Q25: Please provide a phone number or numbers where you can be reached and some suggested days of week and times of day we might try to reach you. Also indicate any periods you know you will not be available, such as when you will be traveling. Research Into Action will treat all of this contact information confidentially.

Primary phone number _____

Secondary phone number _____

Best days of week and time of day to reach you _____

Unavailable period, if known _____

Q26: To thank you for your time, we'd like to provide you with a \$25 Visa gift card. If you would like to receive the card, please provide your mailing address below. All information that you provide will be kept confidential.

Mailing address _____

Please make sure you click “Submit Survey” or your responses will not be recorded.

Thank you for your time. You will receive a gift card from us at the close of the survey period in early July.



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PROCESS EVALUATION QUESTIONS INCLUDED ON THE GREEN CAMPUS IMPACT EVALUATION SURVEY OF GREEN CAMPUS INTERNS

1. Did you have any difficulties conducting any of the Green Campus activities? {prompt with information from prior discussion if needed}
 1. No
 2. Yes
 - a. What are they?
 - b. How were they addressed or what suggestions do you have?
 - 8. Don't know
 - 9. Refused
2. How satisfied are you with the Green Campus Program? Please use a 0 to 10 scale, where 0 is not at all satisfied and 10 is extremely satisfied.
 - 8. Don't Know
 - 9. Refused
3. And using the same 0 to 10 scale, how would you describe the enthusiasm of the school community overall for the Green Campus program?
 - 8. Don't Know
 - 9. Refused
4. Is there anything the Green Campus Program might do to be more successful in campuses like yours?
[Open Ended Response]
5. Do you have any final comments you'd like the program sponsors to hear?
[Open Ended Response]



PROCESS EVALUATION QUESTIONS INCLUDED ON THE GREEN CAMPUS IMPACT EVALUATION SURVEY OF FACILITIES MANAGERS

1. Did you run into any problems incorporating this program at your campus? {prompt with information from prior discussion if needed}
 1. No
 2. Yes
 - a. What were they?
 - b. How were they addressed or what suggestions do you have?
 - 8. Don't know
 - 9. Refused

2. How satisfied are you with the Green Campus program? Please use a 0 to 10 scale, where 0 is not at all satisfied and 10 is extremely satisfied.

[Response on 0 to 10 scale]
 - 8. Don't Know
 - 9. Refused

3. And using the same 0 to 10 scale, how would you describe the enthusiasm of the school community overall for the Green Campus program?

[Response on 0 to 10 scale]
 - 8. Don't Know
 - 9. Refused

4. Is there anything the Green Campus Program might do to be more successful at schools like yours?
 1. Yes
 - i. What?



2. No
 3. Don't know
 4. Refused
5. Do you have any final comments you'd like the program sponsors to hear?
[Open Ended Response]



PROCESS EVALUATION QUESTIONS INCLUDED ON THE GREEN CAMPUS IMPACT EVALUATION SURVEY OF STUDENTS

1. Are you familiar with the “Green Campus” program?
 1. Yes
 2. No

2. Do you feel that there is overall awareness of energy efficiency and conservation on campus, independent of this program, using a scale of 0 to 10, where 0 is not at all and 10 is extremely so? [0-10]
 1. Record 0 to 10 score
 - 8. Don't Know
 - 9. Refused

3. Did you have any difficulties participating in any of the Green Campus activities?
 1. No
 2. Yes
 - a. What are they?
 - b. How were they addressed or what suggestions do you have?
 - 8. Don't know
 - 9. Refused

4. How satisfied are you with the Green Campus Program? Please use a 0 to 10 scale, where 0 is not at all satisfied and 10 is extremely satisfied.
[Rating on 0 to 10 scale]
 - 8. Don't Know
 - 9. Refused



5. And using the same 0 to 10 scale, how would you describe the enthusiasm of the school community overall for the Green Campus program?

[Rating on 0 to 10 scale]

-8. Don't Know

-9. Refused

6. Is there anything the Green Campus Program might do to be more successful in campuses like yours?

[Open Ended Response]

7. Do you have any final comments you'd like the program sponsors to hear?

[Open Ended Response]

