

# **Redefining Homework: Are the Green Schools Program Students Taking Energy Efficiency Home with Them?**

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## **ABSTRACT**

To explore the impact of the Alliance to Save Energy's (ASE) Green Schools Program (GSP) outside the classroom, Quantec conducted in-depth, in-home interviews with the families of ten participating students. The family interviews were designed to gather data regarding the Program's impact on students' at-home energy practices, as well to determine whether the student shared information learned during their experience in the Program with parents, siblings and/or friends. Due to difficulties in soliciting families to volunteer, only a small sample of families with participating students were interviewed. As a result, the following assessment of responses should be viewed as a case study of the experiences of these ten students (and nine families), rather than as a representation of the Program's impacts overall. While the limited sample size prohibits a statistically significant analysis of the findings, the in-depth, in-home interviewing methodology was highly adaptable and led to findings of greater quality and depth by overcoming several traditional barriers to data acquisition. Generally, the results of this exploration indicate that participating students adopted behavioral changes both at school and at home, and shared information learned through the GSP with their families. To a lesser extent, parents and siblings also indicated that they made energy efficiency changes as a result of their child/sibling's participation in the GSP. In addition, they verified that they had observed the behavioral changes purported by the participating student.

## **Introduction**

The Alliance to Save Energy currently implements the Green Schools Program (GSP) in approximately 200 schools in select districts in California, Maryland, New Jersey, New York, North Carolina, and Pennsylvania. Participating schools form a team of teachers, custodial staff, administrators, and students, and this team carries out the program throughout the school year. ASE works with each school to plan events and design curricula to teach students about energy and energy efficiency. The GSP works to create a plan to save energy in school, foster school-wide energy awareness, and disseminate the energy-efficiency message beyond the classroom into students' homes and the local community.

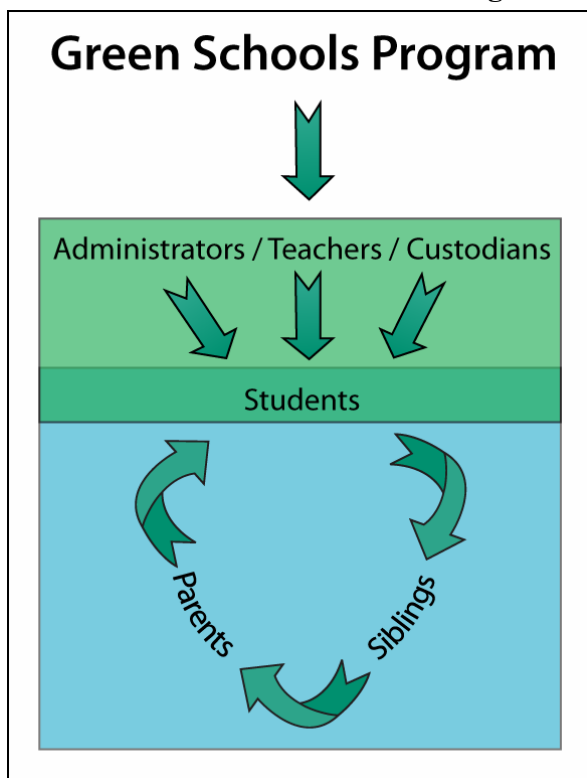
In addition to incorporating energy education into each school's curriculum, schools typically establish "green teams" that execute a range of activities including "energy patrols," energy-themed skits, and topical workshop events. Program lesson suggestions are distributed by ASE to participating schools in a resource binder, and include a breadth of energy education aspects. Lesson examples include where energy comes from, fossil fuels and alternative fuel sources, the links between energy and the environment, and practical instruction on ways to save energy in school and at home.

It has long been assumed that school energy programs, such as the Green Schools Program, have an energy impact that extends beyond both the participating school and

participation period; however, to date, very little research has been conducted to validate this assumption. While a previous Green Schools Program evaluation (Ridge & Associates, 2001) tested participating students and interviewed teachers, administrators, and facility managers, this study is the first to conduct in-depth interviews with participating students to explore Program impacts beyond the classroom.

According to the Green Schools Program model, and as illustrated in Figure 1, dissemination of GSP information occurs in three stages: first, information moves from the program to participating school stakeholders who include teachers, administrators and custodians; then to participating students; and finally, from students to their parents, families and friends. Further, once the information is transferred to family members or the students' social circles, the energy efficiency practices adopted by such individuals serve to reinforce the energy lessons to all parties, including the participating student.

**Figure 1. Dissemination of Green Schools Program Information**



Using the dissemination model shown above, the purpose of the in-home, in-depth family interview was two fold: first, to understand if and how the various program lessons is utilized by participating students at home and, second, to determine whether program information is shared with members of the immediate family and, if so, the extent to which behavioral changes occur, if at all. Because the evaluation sought to gain insight into the application and transference of GSP information at student's homes, rather than to ascertain the specific residential energy savings attributable to the GSP, in-depth, in-home interviews with families of participating students were selected as the appropriate research strategy.

## Methodology

The decision to utilize home interviews was made for a number of reasons. First, since the purpose of the interviews was to determine how lessons from the program are applied in students' homes, the ability to conduct the interviews and gather data on the topic in its natural setting was perceived as a strength of the method (Marshall and Rossman, 1999). For example, during several interviews, participants asked to walk the interviewer through their home in order to physically point out the application of GSP lessons. In some cases, being present in the home seemed to trigger additional comments. For example, one family showed that only one room (a family room/office) had a window-unit air conditioner, and that they had become more conscientious about keeping the door to that room closed since their child's participation in the GSP. Clearly, conducting the interview over the telephone would have prevented such an illustration. Further, while other schools programs such as California Energy Coalition's PEAK (Ridge & Associates, 2001) ask students to bring their home energy bills to class in order to assess changes in usage, this effort represented the first time a program went into the home to gather information about program-related lessons directly. Although this effort did not include a review of utility bills, it does mark a methodological shift in educational program evaluation by bringing the assessment to participants' homes rather than asking them to bring their home to the school.

Second, in anticipation of the logistical difficulties of soliciting the participation of all family members, it was decided that holding the interviews in the homes of participants offered the best opportunity for participation. In recognition of the hectic schedules of parents with school-age children, the program provided further incentive by offering to bring dinner to participating families. In addition, the provision of a meal brought, in most cases, literally all family members to the table and created a friendly, comfortable environment for the interview.

Third, since this was the GSP's first attempt at assessing how program information is applied outside the classroom, it was unclear at the outset whether the best information would be obtained by posing questions to students, parents, and siblings successively or by facilitating the interview around topics to which any participate could speak. Face-to-face interviews allowed for a flexible approach to dealing with this issue. Since participating students had siblings ranging in age from three to fourteen, the ability to tailor interviews to each family was critical. To ensure this flexibility, interviewers utilized a interview guide, rather than a rigid survey instrument, allowing for a conversational interview format. Given the range in participant ages, the conversational approach was seen as the least threatening, and fostered a sense of intimacy that encouraged greater participation by the students and their siblings (Gubrium and Holstein, 2001). Further, it allowed interviewers to clarify and rephrase questions, overcoming perceived ambiguity (Kvale, 1996).

Finally, in-person interviews with the entire family offered interviewers the ability to ask a question of the participating student regarding their actions at home, and then get immediate verification from the parents. By interviewing the family simultaneously, parents were essentially able to corroborate or clarify the student's comments, overcoming issues of cognitive dissonance. As a result, the information obtained during the interviews is of higher integrity than any self-reported student information would have been (Marshall and Rossman, 1999).

Although more expensive to conduct than telephone interviews or even a series of in-person interviews coordinated at a centralized location, such as the participating school, the benefits accrued from the face-to-face, in-home meetings were expected to outweigh the

limitations in sample size. While the sample size clearly limits any statistically significant analysis, the findings offer interesting insight into the application of GSP lessons outside the classroom. Although case study approaches do not lead to indisputable findings, this methodology does offer significant ‘explanatory’ power and has become increasingly accepted as an appropriate form of collecting information in a real-life context (Yin, 2003).

### Sample Composition

As noted, ten participating students were interviewed, along with at least one parent for nine of the students, and a minimum of one sibling for seven of the students. Due to schedule complications, one student had to be interviewed simultaneously with another family, though the presence of the student’s sibling qualified the event as a family interview. The sample also included two brothers who had participated at different grade levels. The group of students represented five schools in the San Francisco Bay Area and a range of levels from 2<sup>nd</sup> through 8<sup>th</sup> grade.

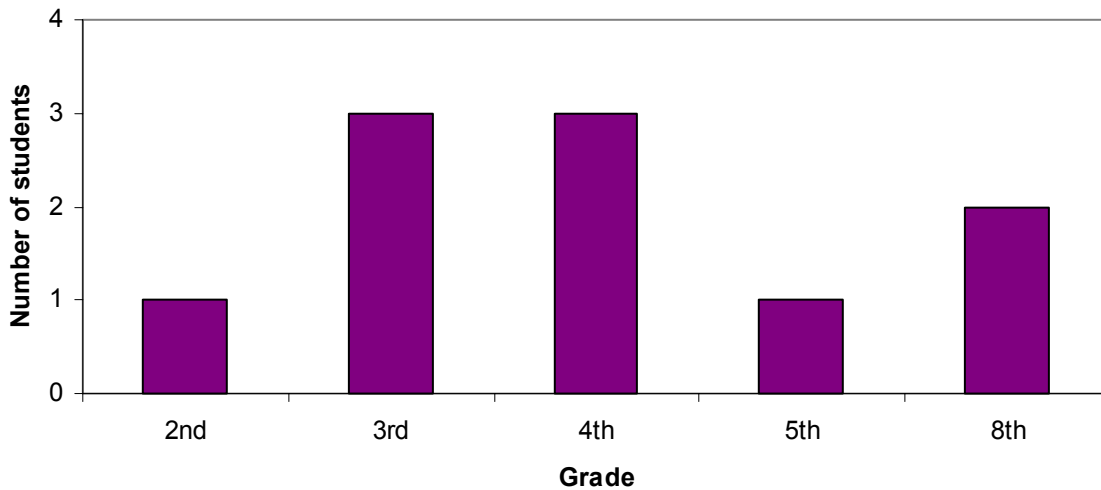
Students who were interviewed volunteered after being notified of the study through their school. It is important to note that, due to difficulties in soliciting households to participate, all responding households were interviewed.

In addition, while the California Green Schools Program covers a large geographic area spanning several utilities, the interviews were focused in the San Francisco Bay Area to limit the costs associated with the interviews. This particular area was selected for the available mix of participating school types. The decision to focus the interviews in the Bay Area, while cost-effective, potentially introduces some bias since program implementation differs by school. As evident in Table 1, the five schools represented three different types of participating students. Table 1 also presents the student breakdown by school. The distribution of students by grade level is provided in Figure 2.

**Table 1. Student Interviews by School**

School	School Type	City	No. Students Interviewed
Hacienda Elementary	First-Year Participant	San Jose	1
Manor School	Graduated Participant	Fairfax	2
Petaluma Junior High School	Second-Year Participant	Petaluma	2
Vallecito Elementary	First-Year Participant	San Rafael	4
Miller Creek	First-Year Participant	San Rafael	1

**Figure 2. Grade Level of Students Interviewed**



The students and families who volunteered to be interviewed were told that a program researcher would bring pizza to their home and talk to them about the participating student’s experiences with the GSP, what they had learned, and if and how those lessons were being used at home.

### **Process & Results: Student Action**

As noted previously, the key aspect of this assessment was to gauge whether and how the Green Schools Program impacts the students’ behavior outside the classroom – at their school, at home, and possibly in their community. Each student was asked if they had applied any of the GSP lessons outside of their classroom. Eight of the ten students stated that they had, and offered a myriad of examples – though only for actions taken around their school and home.

With regard to actions around their school, six students cited participating in “Energy Patrols” that went around the school checking that lights were off, thermostats were set appropriately, and all “vampire plugs” (power chords with transformers that extract energy even when the electronic source is not being used) were removed. One of the students offered details on their patrol saying that the classroom with the least number of energy violations each month was awarded the “Danny Flag,” an achievement flag awarded by the flag’s namesake – the school’s popular janitor – who assisted with the patrols. The remaining two students who had taken action around their school talked about putting aerators on school sinks and making sure lights were off on sunny days. Two students from one school were able to share the lessons they had learned with the rest of the school through plays, such as “Cinderella – Green Team Style” and “Mission Impossible,” which were performed during all-school assemblies. The students said that the plays were fun and very popular with the other non-Green Team students in the school. One of the plays was even performed during a district school board meeting.

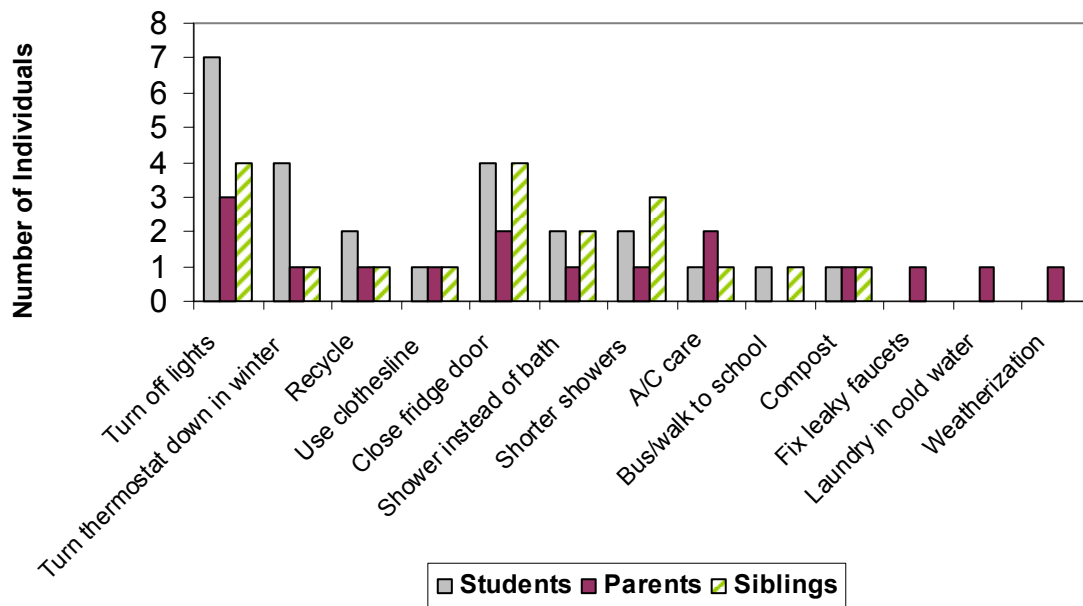
The majority of interviewed students, eight of the ten (though, interestingly, not the exact same eight who took actions at school), stated that they had taken energy related actions at home<sup>1</sup>. Many of the actions taken at the school were also applied at home, with five students responding that they turn off lights and four others answering that they have adjusted the setting

<sup>1</sup> In some cases students cited multiple actions taken at home, therefore totals add up to greater than eight.

on their home thermostat. Students also mentioned checking for vampire plugs, making sure family members close the refrigerator door, turning off the television when no one is in the room, and taking water-related steps such as installing faucet aerators and high-efficiency showerheads, and taking shorter showers. In addition, all but one student said they had talked to a member of their family about how to improve the energy efficiency of their home.

In order to assess the types of behavioral changes resulting from participating in the Green Schools Program, each family member was read a list of energy efficiency habits and energy-saving behaviors that are commonly taught in the program and asked whether they had implemented any of them at home. It was made explicit during the interviews that they should *only* indicate those behaviors that have changed as a result of the program. Figure 3 displays the frequency with which various energy efficiency measures have been implemented in the students' homes. The most common behavioral change by the students (7 of 10) was turning off lights when not in use. Siblings (3 of 6) and parents (4 of 8) also most commonly cited turning off lights. Other common behaviors for all family members included being more diligent about keeping the refrigerator door closed, turning the thermostat down in winter, and taking shorter showers.

**Figure 3. Energy Efficiency Actions Taken at Home**



### Sibling and Parent Experience

As noted earlier, one of the objectives of the interview was to determine the influence that the student's participation in the Green Schools Program had on the energy-related behaviors of the other members of the household. In addition, to gain additional perspective on the impact of the program on the participating students, both siblings and parents were asked if they had noticed any changes in the student's behavior at home since taking part in the GSP.

For nine of the ten participating students, at least one parent was interviewed. One student, whose parent was unable to attend, was interviewed simultaneously with another student

under the supervision of that student's parent. Six of the ten students had siblings who attended the interview.<sup>2</sup>

### **Sibling Impacts and Observations**

When the siblings were asked if the participating student had taught them some of the things they had learned, five of the six siblings interviewed said they had. No trends appeared in the lessons passed along, with each sibling citing a different lesson learned. Responses included being more conscious about closing the refrigerator door, turning off lights, not wasting water, taking shorter showers, and not littering.

Four of the five responsive siblings noted that they had observed a change in the behavior of their brother/sister at home with regard to their energy usage. Examples again included increased diligence in turning off lights when rooms are not in use and water consciousness. Perhaps one of the more telling remarks came from a sibling who was unable to provide a specific, but offered, "I don't know, but he talks about it all the time."

Lastly, the siblings were each asked how important they thought it was to pay attention to energy efficiency after their brother or sister's participation in the program. Four of the responsive siblings thought that it was "Very Important" to pay attention to energy use at home, while two felt that it was "Somewhat Important."

### **Parent Impacts and Observations**

Similar to the question posed to the participants' siblings, parents were also asked if their child had discussed his/her participation in the GSP and household energy usage with them.

Parents were asked whether they had noticed a change in their child's awareness of energy issues and/or behavior. With the exception of one parent who noticed a change only in his child's awareness, all the parents indicated that they noticed a change in both the energy efficiency awareness and the behavior of their child as a result of the Green Schools Program. One parent made the comment: "Our overall knowledge [as a family] has improved a little; he's raised our awareness and reinvigorated the family."

Parents were also asked about changes in their own knowledge/understanding of energy issues, as well as attitudes toward the importance of paying attention to energy. Of the eight parents interviewed (one of the student's parents could not attend and two of the interviewed students were brothers), four described themselves as "Very Knowledgeable" regarding energy and efficiency, two felt they were "Somewhat Knowledgeable," while the two others described themselves "Not Very Knowledgeable" before their child participated in the program. Six of the eight parents felt that their knowledge/understanding had changed as a result of their child participating in the GSP.

Parents were also asked if they had analyzed their energy bills prior to and after their child's participation in the Green Schools Program and, if so, had noticed any changes in the bills. Four of the eight parents had examined their energy bills prior to the program, with one additional parent analyzing bills after the program. One parent noted that their water bill had come down, and one had noticed lower electric and gas bills.

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<sup>2</sup> Of the six siblings interviewed, one was too young to give meaningful responses to some of the questions. When that sibling was unable to respond, the other five will be referred to as the "responsive siblings."

However, the remainder of the respondents indicated that it is difficult to determine what, if any, changes have occurred on their bills. In some cases, this was due to a lumping of utilities into one bill; in others it was due to a general rise in gas and electric prices in the last year.

## **Conclusions**

Two sets of conclusions are offered below. The first pertains to the findings of the interview process, and the second comments on the methodology applied when conducting the interviews.

## **Interview Findings**

It is important to recall that the information obtained from this study is not representative of the population of students, parents, and siblings who have been involved in the GSP; rather, it is a qualitative assessment of the experiences of these nine families (and ten students). Despite the limited sample size, the following highlights some of the more interesting findings:

- The majority of students (8 of 10) stated that they had taken energy efficiency-related actions, typically in the form of behavioral changes, both at school and at home. Commonly cited actions taken at school included turning off lights, monitoring thermostat settings, and going on “Energy Patrols,” while the most frequently referenced actions at home included turning off electronics when not in use, installing showerheads/aerators, and taking shorter showers, in addition to being more diligent about turning off lights and placing the thermostat at an energy-efficient setting.
- In addition to the students noting changes in their own behavior, all but one of the parents interviewed reported observing a change in their child’s behavior since participating in the Green Schools Program. The observations of the parents validate the student’s statements and the program’s ability to transcend the classroom.
- Of the six siblings interviewed, five noted that their sibling had taught them something about energy or energy efficiency since they participated in the GSP. Several of the siblings reported taking action around the home, and all six said they now felt that energy efficiency was either “Very Important” (four) or “Somewhat Important” (two).
- While the students, their parents, and their siblings noted some specific behavioral changes, all families expressed an overall increase in their general awareness of energy issues in their homes as a result of the student’s participation.
- It was the observation of the interviewers that the majority of the students were very enthusiastic about their experience in the program, which was indicated by the excitement with which students explained GSP school events and lessons. Several of them were able to effectively transfer that interest and enthusiasm to their parents, siblings, or both.



## **Methodological Findings**

The approach of conducting in-person family interviews, as opposed to alternative methods such as phone surveys, group interviews at school, or student testing, was an effective forum in which to explore the influence of the Green Schools Program outside the classroom. The benefits of the home interview method included an opportunity to have all or most family members present, which facilitated a robust, lively conversation. The “family dinner” setting for the interviews allowed family members to feel comfortable, and provided an opportunity for parents and siblings to verify student claims regarding the extent to which they had taken information from the classroom and brought it into the home. Having the interviewer present also allowed the families to visually demonstrate some of their points.

A key advantage of the method was the flexibility associated with being present in the students’ homes. In some cases, some of the younger students were less effective at communicating and parent corroboration and clarification of their statements was essential. A phone survey would have precluded such clarifications, and would have made the lively family discussions impossible.

Another advantage of the home interview is the convenience for the participant. Several parents commented that they likely would not have participated had the interview been conducted outside their home. The difficulty of coordinating differing schedules during the evening hours was cited as a significant barrier to interviews held outside the home.

There are also some weaknesses associated with the approach. Since participants volunteered to participate, there was an inherent element of self-selection to the sample. Despite the provision of dinner and a willingness to meet at the participating student’s home, soliciting participants was problematic. Another drawback was the limited amount of data the interviewer was able to collect in a day. Since the interviews took place in the evenings, typically over dinner, it was difficult to complete more than one interview an evening. In cases where homes were located nearby and the contacts at each home were willing to meet earlier or later in the evening, it was possible to complete two interviews.

## **Suggested Further Research**

Due to the complexity of evaluating the effects of the Green Schools Program on a range of students of different ages, the flexible and interactive family interview approach is an effective means of assessing lessons learned. When looking to determine the extent to which students take program information about energy efficiency home with them, it is beneficial to see the home first hand, and speak with the family as a whole to confirm and verify student claims. With more funding and time, a more comprehensive study of GSP information effects beyond the classroom would allow a statistically significant quantification of the qualitative data obtained with this method. Additionally, a billing analysis of participating students’ homes could be conducted concurrently. Adding a temporal aspect to the study, whereby students would be interviewed at different time increments after they leave the program, would also provide the benefit of learning how well the information learned in the GSP is retained over time. The anecdotal information gathered in this study gave an indication of which program elements resonated with the students and transcended the classroom into the home, but this information should be expanded. Future research should refine interview questions to hone in on those

aspects of the GSP that students are most excited about, and to quantify the portion of students acting on lessons learned.

Finally, an expanded data set would allow for a more robust analysis. For example, levels of student action at home could be correlated with individual schools, and a comparison of the effectiveness of different lesson plans would be possible.

The anecdotal information obtained with this study demonstrated a high level of enthusiasm for the Green Schools Program as a whole. The majority of students interviewed did take classroom lessons and apply them to their own homes, and in many cases this zeal spilled over into the students' families. An expansion of the home interview method into a larger, more representative sample could bring valuable insight into the effectiveness of specific aspects of the GSP, as well as allow for a quantitative assessment of their impacts beyond the classroom.

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