

Increasing Energy and Environmental Awareness in the Next Generation: An Innovative and Cooperative Approach

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Energy Efficiency for Oregon Schools (EEOS) is a broad coalition of public and private organizations formed to encourage the implementation of conservation measures through a better understanding of the connection between energy use and the environment in which we live. Using the EEOS acronym, the coalition designed and implemented a pilot program with two distinct elements: Energy Efficiency Retrofit (school facility), and Energy Smarts (classroom to students' homes). The first element addresses the immediate physical plant needs of the local school facilities. A retrofit energy analysis is performed jointly by gas and electric utilities, with joint funding for cost-effective energy efficiency measures that would reduce the school's energy consumption and budget requirements. The second element is designed to effect a permanent change in how students and their families use energy. This element provides teachers with supplemental classroom materials and homework activities to increase student awareness of the interdependency between energy usage and the environment. This paper describes the program components, pilot program activity, the preliminary process evaluation, and the coalition's plans for the future.

Introduction

This project demonstrates the ability of a public/private coalition to combine its resources to respond to a need to increase energy efficiency in school buildings while simultaneously instructing students about energy efficiency actions they could implement or influence in their daily lives.

In 1991, Oregonians passed a citizen-initiated property tax limitation measure which seriously impacted school budgets. The State Superintendent of Public Instruction, who is also a former member of the Northwest Power Planning Council, publicly embraced the concept of saving energy as a key means to lower school costs. As a result of her understanding of energy issues, she was instrumental in targeting schools for energy efficiency. Consequently, utilities were invited to participate actively with school districts to help reduce utility costs and improve efficiencies¹. This recognition of the importance of the efficient use of energy corresponds closely with that of Portland General Electric (PGE), Northwest Natural Gas (NNG), Oregon Department of Energy (ODOEn) and the Northwest Power Planning Council, which had already identified schools as having viable opportunities to increase cost-effective energy use practices and equipment modifications (NWPPC, 1991).

Historical Overview

Traditionally, each group would have approached school districts with its individual programs for energy efficiency. Recognizing this overlap and inefficiency to all involved, PGE initiated discussions with interested parties to develop a coordinated approach to implementation of energy efficiency measures in school buildings. During the preliminary discussions, the suggestion of expanding the effort to students and their parents emerged.

Since utilities have historically provided safety education programs to students, it seemed a small step to use the existing structure to deliver energy efficiency education. Also, people involved in the meetings felt the concept could work since many of them were parents and became recyclers as a result of participating in school projects with their children. This concept seemed a plausible avenue to explore. Thus, a two-pronged program concept was ready for further development.

Overcoming the hurdles associated with providing a coordinated approach to school buildings was fairly straightforward. Coincidentally, PGE was developing a shared savings funding option (Energy Services Funding Option (ESFO)) to help commercial customers make energy efficiency improvements without up-front capital

costs. Payments for the improvements would be based on the customer's savings in energy costs. Schools have financial systems that make them ideal candidates for ESFO-type funding. The capital budgeting process could be circumvented while the school was guaranteed lower operating costs. This program option was expanded to include joint gas and electricity audits and funding by the utilities involved.

Developing or finding an existing model to deliver energy efficiency messages to students resulting in measurable physical outcomes and long-term changes in student and family behavior was more difficult. Results of the effectiveness of home energy audit programs have had mixed reviews. Some have resulted in measurable energy savings and others have not. Comparative evaluations of pilot audit programs or auditor effectiveness have established that the person delivering the message is as important as the message being delivered (see Haeri 1990, Peters 1990, and Dormant, 1988). Concurrently, PGE was struggling with how to increase the participation rate in its residential audit program. Thus, an audit-based approach delivered by utility staff already familiar with classroom education was decided upon as a first step.

An extensive national search of existing educational materials² was conducted to select appropriate resources for classroom teachers that met the program energy efficiency goals. Locally, the results were available for an award winning conservation education demonstration program in the Eugene, Oregon school district. This program linked classroom instruction, student behavioral changes and equipment retrofits in the school building to school energy savings³. The assistance of the National Energy Foundation, the Northwest Regional Educational Laboratory, and the Oregon educational community was sought to lend expertise to the curriculum identification and selection process. The selection criteria ensured that the materials would supplement existing classroom instructional outcomes required by the state (ODOE 1989) and involve the students' families in the educational process.

The following assumptions were central to developing the program plan:

- Select or modify existing "hands-on" and "homework" education programs with an environmental theme across all grade levels.
- Select program actions consistent with the utility's Least Cost Plan.
- Develop a cooperative partnership among gas, electric, public and private utilities.

- Enlist the cooperation of the state's educational and environmental communities to develop the necessary framework for a successful, long-term program.

Recognizing that long-term behavioral changes would need constant reinforcement and that environmental and economic benefits could induce change (Harrigan 1991), existing models were considered or developed for a comprehensive K-12 approach. The result of this effort led to adopting two existing models: 1) a student-administered home energy audit and classroom presentations piloted by an Arizona utility for use in 8th and 9th grade classrooms and 2) an energy and environmentally grounded existing product for K-3. Coalition members and local educators developed the 4-7 and 9-12 components with review and comment by nationally recognized educational and energy groups prior to implementation. Details of the program are presented in the Program Description section.

Program Description

Working together, the members of the coalition designed and implemented a pilot program for the 1991-92 school year with two distinct elements: Energy Efficiency Retrofit (school facility), and Energy Smarts (classroom to students' homes). The first element addresses the immediate physical plant needs of the local school facilities. A retrofit energy analysis is performed jointly by gas and electric utilities, with joint funding for cost-effective energy efficiency measures that would reduce the school's energy consumption and budget requirements. The second element is designed to effect a permanent change in how students and their families use energy (Harrigan 1991). This element provides teachers with supplemental classroom materials and homework activities to increase student awareness of the interdependency between energy usage and the environment.

Energy Efficiency Retrofit for Facilities

The goal of the facilities element of the program is to reduce a school's energy budget from 15% to 30% of its historical average. On the electric side, PGE estimates this program could contribute 7% of the demand-side resources needed by 1995. To achieve the goal, schools are eligible to receive free facility energy audits, low interest loans, rebates, or the shared savings ESFO program. However, the primary participation mode for the school districts is the shared savings ESFO program.

The ESFO has two phases. In the Installation or Investment Phase (see Figure 1), PGE/NNG purchases the right to share potential savings identified in an energy

analysis. The school then uses the money from PGE to install school-owned energy efficient equipment or facilities. This phase ends when PGE/NNG certifies the installation during an on-site inspection.

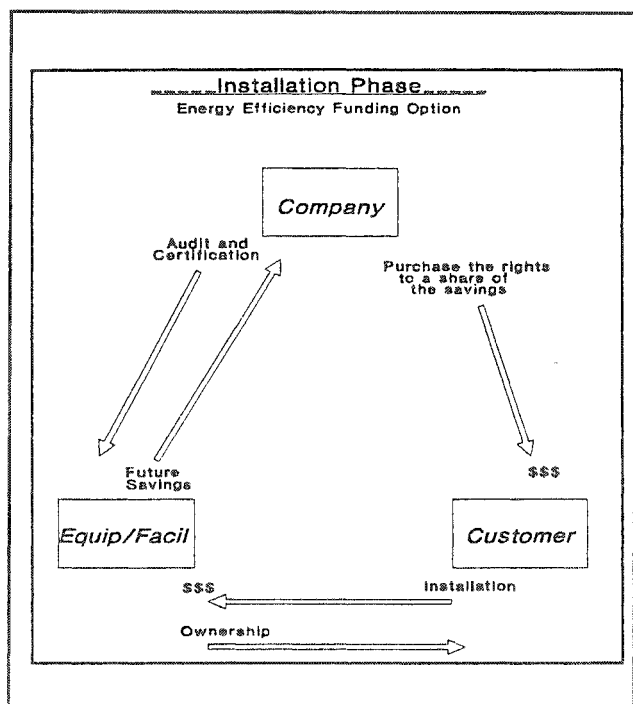


Figure 1.

During the Operations or Return Phase, PGE/NNG verifies the amount of energy saved (i.e. Btu, Kwh, etc.), and the total net dollar savings in fuel bills to the school. The total energy savings is noted on the school's monthly "Energy Savings Worksheet", and the 75% PGE/NNG share is shown as an "Equipment Funding Payment" which will be added to a single combined bill for gas and electric services.

The total bill is expected to be slightly lower than before the installation of Energy Efficiency solutions. However, the billing amount derived from kWh and kW sales is significantly less than before. At the end of 10 years (or when full investment recovery is complete, whichever is less) the charge will disappear, while the savings will continue for the remainder of the asset's useful life. Lastly, the school can choose to buy back PPG/NNG's remaining share of the savings at any time. In addition, since seasonal load shapes may vary significantly, payments are patterned relative to the school's monthly load shape. This feature reduces the likelihood that a monthly EFSO payment would ever exceed the total energy bill for a particular month. Currently, a small PC

based manual process is serving as a prototype system which compiles the electricity charges, gas charges, and the shared savings payment. In the future, a more interactive system could eventually be developed if the volume in the ESFO would warrant it.

Facility Activity Level. In the past, schools did not often take advantage of energy efficiency measures due to the high initial cost of large energy systems. However, the heightened focus on the increasing cost of energy and the move toward energy efficiency has spilled over into school administration and facility management.

The coalition's plan called for a half dozen schools to take advantage of the EFSO. However, instead of signing up one school at a time, entire school districts were interested in "developing master plans" for "all buildings" in the district. Including several of the state's largest districts, about 200 school campuses are now identifying themselves as "prospects" for energy efficiency audits and subsequent retrofits.

Classroom Energy Smarts Components

Energy Smarts is a comprehensive set of activities for Kindergarten through 12th grade aimed at supplementing typical classroom curriculum with "hands-on" activities in the students homes, usually with their parents. The goal of the classroom element of the program is to encourage children to perform "learn by doing" activities in class and at home, and to choose an energy efficient way of life through a deeper awareness of the interdependency between energy use and the environment (See Figure 2). The coalition named the classroom program "Energy Smarts" and developed four distinct program levels:

- K-3 Think Earth Kits⁴
- 4-7 EcoActivities
- 8-9 In Concert with the Environment⁵
- 9-12 EcoGrants

K-3 Classroom Activities. Think Earth, produced by an independent firm, is an environmental education program that teaches students to conserve natural resources, reduce waste, and minimize pollution. Think Earth has 4 units and they are available to schools participating in the Energy Smarts pilot.

The Think Earth program addresses the major elements of the environment - air, land, water, energy - in one instructional package. It was developed by professional curriculum developers working with teachers, students, government environmental agencies, and electric and gas utilities.

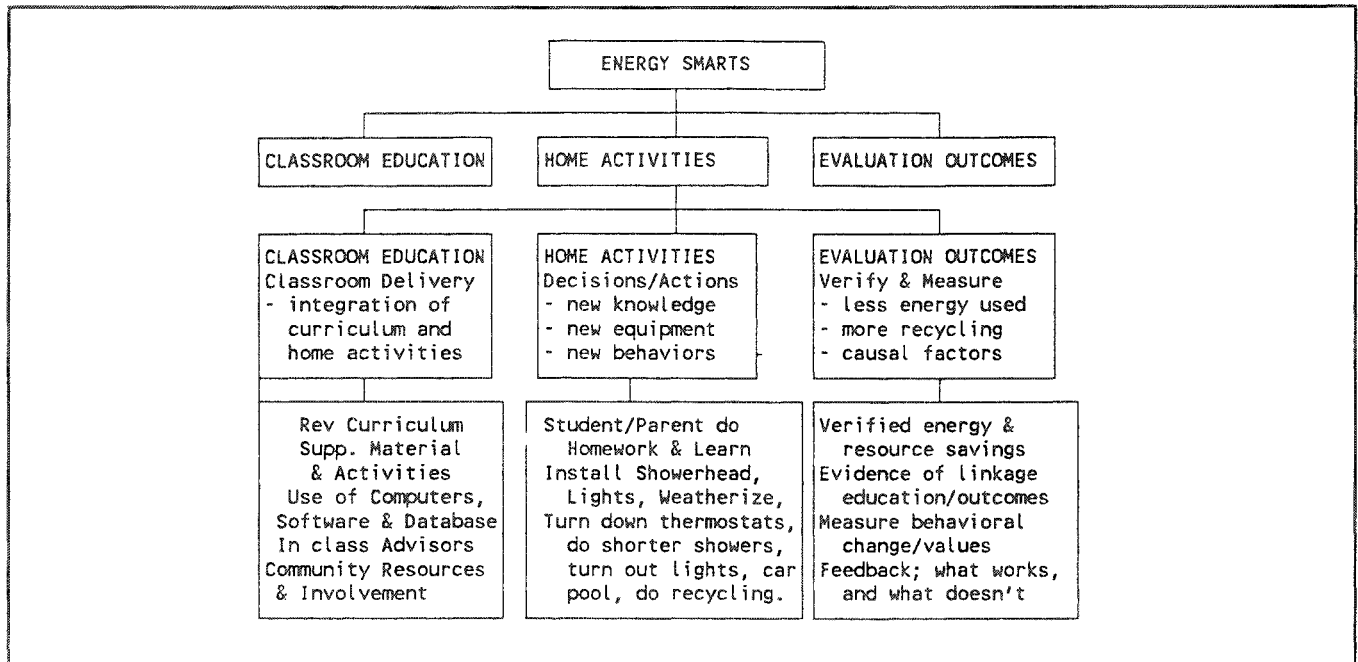


Figure 2.

Each Think Earth unit contains the following components: (1) teacher guide; (2) Think Earth videocassette; (3) two full-color classroom posters; (4) two sets of illustrated story cards; (5) natural resource and product cards; and (6) reproducible masters for pre- and post-testing, practice activity sheets, and take-home family activity sheet. The Think Earth packets are structured to produce a different learning outcome for each grade. *Kindergarten* focuses on conservation, with an emphasis on the natural environment including sun, air, land, water, plants and animals. Other topics include the concept that wasting paper and littering can harm the environment. *First Grade* also focuses on conservation and emphasizes that the natural environment provides valuable resources for us to live. It stresses that students' families can do many things to conserve natural resources and produce less waste. *Second Grade* focuses on waste reduction and how students use natural resources to make many products. Students are taught how recycling cans, bottles, newspapers, plastic, and yard waste can conserve natural resources, save energy, save land, and reduce pollution. *Third Grade* emphasizes pollution control and how producing, distributing, consuming, and disposing of products create waste that goes into our water, onto our land, and into our air. Activities stress how the students can do things to help control pollution.

The Think Earth kit was developed to be environmentally conscious. Materials for students and parents are provided on reproducible masters, so teachers can make only the

number of copies they need or can use the masters for overhead projection, thus saving paper and reducing waste. As of April 1, 1992, Think Earth has been deployed in fifteen PGE service area classrooms, involving more than 400 students.

Grades 4-7 Classroom Activities. The EcoSmarts program teaches about energy efficiency in an environmental context. It involves children in selecting and carrying out activities that help them be more conscious about energy-related issues and the environment. By incorporating science concepts reviewed by the Oregon Department of Education, each child is encouraged to select from several alternatives actions relating to energy and the environment. The student receives a Student Activity Sheet that provides instructions for individual use at home. The activities are designed both to induce an actual reduction of energy consumption within the family (turning off the lights; using less water, whether hot or cold) and to suggest environmentally supportive tasks such as recycling or planting trees.

Each activity contains a requirement that the student engage in conversation with his or her parents: the program seeks to involve parents as well as students in practicing more energy efficient behavior and being more conscious about the needs of a sensitive environment. Each student receives EcoSmart Points for satisfactorily completing each activity. Students are awarded a

Certificate of Achievement upon completing the activities for their grade.

Each classroom is provided with an EcoSmart kit containing the following components: (1) teacher guide; (2) Materials Manager (box for activity sheets); (3) student activities Wall Chart; (4) certificates of achievement; (5) grade-specific student activity worksheets; and (6) reproducible pre- and post-tests.

Recommended energy efficiency activities incorporated in the program include the following: using energy efficient light bulbs at home; installing a low flow shower head; examining the home for areas where energy is wasted; turning down the thermostat; turning off the lights and television when not needed; washing clothes and dishes only when the washer contains a full load; heating water in a covered container, etc.

Environmental awareness activities include recycling; keeping the lawn longer; bringing a reusable bag to the grocery store; purchasing food contained in non-wasteful packages; planting a tree; adopting an endangered animal; and identifying environmentally conscious values.

This component of the pilot program was fielded during the spring of 1992 in 38 classrooms involving over 800 students. The program will be expanded subsequently to schools throughout the state.

8-9 Classroom Activities. In Concert With the Environment (ICWE) is an environmental and energy management program. Through hands-on student activities and real-life analyses, In Concert teaches students and their families to recognize the link between environmental quality and personal energy habits. Environmental stewardship becomes the motivation for young people to adopt more energy efficient practices. Utility staff who are specially trained visit the classroom and present the material and activities to the students.

The program gives participants experience and practical information about how to measure and reduce energy consumption in their own households. This approach takes energy conservation beyond a textbook concept and shows children how to make a real difference in their families' energy usage.

An introductory video that sets the tone for effective student participation. The "In Concert" educational experience features an illustrated student workbook for each child and an in-depth home energy audit. Following an in-class presentation of the program's objectives, students receive an easy-to-use workbook which guides

participants and their families through a home energy audit. Both the economic and environmental value of wise energy use is highlighted as students evaluate eight household end-use applications.

Students continue the interactive activities by entering their household data into lap-top computers and creating individualized Energy and Environment Reports. These reports incorporate specific recommendations for each family to reduce energy consumption based on the household's historical consumption pattern.

The report offers a graphic representation of the annual energy costs for various appliances in the home, as well as the annual cost of family transportation. In addition to specifying potential cost savings, the report captures the environmental benefits of implementing suggested changes using a new term, EcoWatts.

After successful completion of the program, the student receives an attractive Certificate of Completion. The entire family benefits from an enhanced understanding on the link between environmental quality and energy consumption.

In Concert includes a take-home packet that includes both gas and electric program offers of existing residential programs. Students who test their home showerhead flow and demonstrate the need for low-flow showerhead receive a free showerhead kit. The cost of the kits is shared between traditional competitors, NNG and PGE. During the 1991-92 school year, presentations were given to over 2,400 students in thirteen schools.

9-12 High School Program. The EcoGrant program is designed to encourage high school teachers to develop creative, original projects that school budgets typically cannot afford. EcoGrants, averaging \$250 each, will be given to winning teachers from both public and private secondary schools participating in the Energy Smarts program. The goal of EcoGrants is to foster imaginative means for students to demonstrate energy-related classroom projects that encourage both environmental awareness and energy efficiency from as many school subject matter areas as possible.

Teachers are invited to submit EcoGrant proposals which then will be evaluated by personnel from participating schools, the Oregon Department of Education, the Oregon Department of Energy, environmental organization and electric and gas utilities. Judges look especially for interdisciplinary projects presenting concepts featuring problem solving, decision-making and critical thinking skills. Originality plays a large part in the selection

process and can prove to be the winning advantage as teachers and their classes compete for grants.

Though still in the initial phase, efforts are being made to provide up to \$2000 in EcoGrant allocations to each high school participating in the Energy Smarts program.

Possible projects might include the following: (1) student research projects; (2) production of a newsletter; (3) video tape of play; or (4) hands-on science projects on issues such as recycling, trees, alternative energy sources (solar, biomass, etc.), global warming and acid rain.

Primary consideration is given to projects with the potential to make a lasting impact, such as replicating it for broader use. Additional factors that are considered include the number of students who will be involved and the potential to improve student attitudes and behavior related to environmental concerns as well as the cost-effectiveness of the project. An advisory team made up of representatives from Oregon Departments of Energy and Education as well as utilities, is reviewing proposals.

Program Evaluation

Developing an evaluation plan for the program presented formidable challenges to the staff. Issues ranged from technical impact issues such as how to measure and separate the energy savings from behavioral effects from the installation of energy efficiency measures to process issues relating to program acceptance and educational content. In addition to these issues, coalition members wanted timely feedback on whether they should continue the program in the 1992-93 school year. Though evaluation of the program always had been a consideration of the coalition, utility evaluators were not brought into the process until the later stages of program development.

While each issue was important, coalition members were first asked to prioritize what they wanted to learn from the facilities component and the educational component. Since PGE already had an evaluation plan for existing commercial/institutional buildings, the evaluation of facilities component was simply added to the existing evaluation and will not be discussed in this paper.

Objectives

Prioritizing the needs for the educational component resulted in developing a set of issues to be explored. For the initial evaluation, process objectives were defined as learning 1) What is teacher acceptance of the program and will they participate again? 2) What is student acceptance of the program? 3) Did the students transfer information

to their parents? 4) How does the information mesh with what is currently being taught in the classroom? Immediate impact objectives were to measure the level of behavioral changes by family members and the number and types of physical measures installed. The long-term impact objective was established as a follow-up energy savings analysis if process findings indicate such an analysis is warranted.

The next step involved deciding which of the four element needed to be evaluated first given the time constraints. Since the 8th and 9th grade element required substantial classroom involvement and would be implemented first, the primary evaluation effort was devoted to this element. A secondary focus was placed on teacher acceptance of the materials and process of the 4th-7th grade element. Evaluation of the K-3 element was not included at this time since it is a more established product. The 9th-12th was excluded since its success will be primarily assessed by whether or not schools apply for grant applications.

ICWE Plan

The process and initial impact evaluation design for the 8th-9th grade element employs survey research methods. Three surveys were developed, one each for teachers, students, and parents.

The teacher survey was delivered to the classroom teacher at the end of the final session with instructions to mail it to the evaluators. Confidentiality of their responses was guaranteed. The questionnaire is designed to assess how well the material meshed with their curriculum, how they felt about the process used to inform them of the program, their assessment of the content of the material and presenters, and whether they would participate in the future.

For this paper only the results of the teacher survey for the 8th and 9th grade were available and are discussed in the next section.

Student and parent telephone surveys were developed and administered by an independent research firm. Student questionnaires focused on student reaction to the classroom presentations, the audit, their understanding of energy and environmental issues and whether they have made any energy-related changes in their behavior. Parent questionnaires probed whether the student discussed the presentations with the parents, gave the parents with the audit results and free showerhead. Additional questions concentrated on whether the parents reviewed the material, installed the showerhead, undertook or plan to

undertake any energy efficiency actions, and behavioral changes made by parents or students.

EcoActivities Plan

The teacher survey for the 4th-7th grade teachers contained questions similar to the 8th-9th grade survey. This element of the program was not implemented until the Spring 1992 semester. Therefore results are not yet available. No follow-up student survey is planned for the initial group of students. Rather, the focus is on determining whether teachers find the program and its subject matter useful.

Future Plans

An evaluation of the educational content of the specific elements was delayed until the coalition knew whether the program was acceptable to the classroom teacher and students. Currently, planning is underway by an independent educational research group for a formal content evaluation. Future impact issues will concentrate on measuring the persistence of behavioral impacts and whether they are the result of the program.

Teacher Satisfaction Evaluation Results

Preliminary process evaluation results of teacher satisfaction with the In Concert component have been completed. Teachers responded for sixty percent of the first semester classes. In Concert reached sixty classes (1,200 students) during the first phase of the pilot. Information is available for at least two classes in all but one of the seven participating schools.

In general, teachers felt that the decision to participate in the program was made by the individual teacher rather than the school principal. Most teachers (78%) met with a program representative before the classroom presentations. Teachers who did not meet with a program representative prior to the presentations either had the program explained by another teacher or felt that they did not have a sufficient prior explanation and most felt that they had a good understanding of the program's goals and objectives.

Individual teacher contact prior to the classroom presentations is a key factor to program acceptance and to proper understanding of the program's goals and objectives. Teacher buy-in to the program helps ensure that the class had been adequately prepared for the classroom presentation. Additionally, as the program becomes more widely accepted, In Concert presentations

will be scheduled to dovetail with the teacher's lesson plans. This planning should increase the effectiveness of the program by reinforcing what the students are learning from their teacher.

Student Awareness

Approximately 90 percent of the teachers agreed that their students' awareness of energy issues was increased as a result of the program while only 71% agreed that awareness of environmental issues had been increased. Teachers were asked what information areas were not normally covered in class. These areas included energy electricity, gas, oil, water, transportation, recycling, and the general environment. Electricity was cited most often as not normally covered (71%) with transportation second (67%), water third (57%), and gas and oil information tied for fourth (52%). Most teachers felt that recycling, the general environmental and energy issues had already been addressed in the classroom prior to the program.

Differences in teachers' assessment of students' level of awareness of energy and environmental issues did not vary significantly by school. However, reports of information areas varied significantly across schools. No single school reported that every teacher had covered every topic. The results indicate a greater need in the schools for understanding specific energy issues than issues generally perceived as environmental issues. While most teachers felt that energy per se had been addressed in their classrooms, specific information on energy sources (gas, oil, electricity) had not been.

Program Components

Seventy-five percent of the teachers felt the classroom presentations met their overall expectations. The majority agreed that the presentations flowed smoothly and were appropriately structured for the grade level. The presentations also generated subsequent classroom discussions, thus reinforcing the concepts presented in the program.

Presenters were given high marks for their command of the subject matter, indicating that the presenter training is an extremely important factor in teacher and student acceptance. Teachers were slightly critical of the presenter's style of explaining the subject matter. The slightly lower ratings on presentation style and explanation of audit results may be more related to an individual teacher comparing a presenter's style to his or her own teaching style than flaws in the presentation. However, presentation style did receive slightly lower marks at the first school participating in the program, which probably

is related to the presenter developing an initial feel for the material and how the sessions should be structured.

Responses to the videotape were quite critical. The majority felt it was too long. Comments includes criticism of the length, relevance, and talking heads. As a result, the video has been substantially reworked for the second phase of the pilot.

At least 80% of the teachers agreed or somewhat agreed that the student workbook was appropriate for the grade level, had clear directions, interesting explanations, and was easy to complete. Approximately 90 percent agreed or somewhat agreed that the audit results were easy to understand. However, only slightly fewer (79%) thought that the results seemed reasonable to the students. These findings seem to mirror other evaluations of computer audit programs.

From the teacher's perspective, In Concert has been well received by them and by the students. Though the program seeks to provide information on energy and the environment, most teachers felt that the basic environmental issues had already been covered in class. Specific information on the forms of energy used was more valuable to the teachers than information on energy per se.

Key to the success of the program is teacher briefing prior to the program and participation in the decision-making process. In their written comments, teachers expressed the desire to schedule the timing of the sessions for maximum effectiveness.

Clearly, teachers appreciate the In Concert concept and its role in the classroom.

Future Participation

Almost 95% would participate again, with 68% using the total program. Only one teacher felt that it was inappropriate for PGE and NNG to be presenting the program. However, the teacher would participate again.

Future Directions

The initial coalition is establishing a regional collaboration group for the purpose of developing a regional strategy supporting the environmental and energy education. Members are the Northwest Regional Educational Laboratory (NWREL), Bonneville Power Administration (BPA), NNG, PGE, Oregon Department of Education (ODOEd), ODOEn. The collaboration is identified as the Northwest Collaboration for Energy Education and the

Environment (NCEEE). NCEEE establishes the following strategic components:

Energy Efficiency in PGE/NNG Schools: The first two components are being implemented in parallel; Energy Smarts in Classrooms and Commercial Retrofit of School Facilities. Some elements have already been implemented, while others will be implemented in the remainder of the 1991-1992 school year.

Regional Collaboration on Energy Smarts: There is a strong desire by the group to adopt Energy Smarts quickly. PGE's partnership with NNG, ODOEnergy and ODOEducation give us the ability to establish a regional/national project (partially funded by federal money), maintaining a position of leadership within the region. Planned actions include applying for Federal Funding as a regional conservation project, helping other utilities adopt the Energy Smarts program elements, and identifying opportunities to "cost share" development, implementation and evaluation tasks on a regional basis rather than having any single utility bear the total burden of justification of costs and benefits.

Conclusions

The facilities retrofit program found an unexpected synergy between the classroom activities and with the school administrators and facility managers. Managers response to gas and electric sponsored energy efficiency programs exceeded projections.

Although Energy Smarts is a new initiative, many of the resources necessary to develop and implement the programs were already in place, thus eliminating the need for staffing increases. A key value to PGE was that Energy Smarts expanded PGE's resources by leveraging the cooperation of the gas utility (NNG), ODOEn, ODOEd, as well as the teachers, students, and their families. Each member can receive substantial benefits in terms of both energy efficiency acquisition and enhanced community relations that outweigh their program costs.

Key to the success of the program is teacher briefing prior to the program and participation in the decision-making process. Teachers' desire to participate in the Energy Smarts program greatly exceeded expectations. In their written comments, teachers expressed the desire to schedule the timing of the sessions for maximum effectiveness. They responded positively to the classroom activities and appreciated the balanced treatment of gas and electric issues as well as the link to environmental benefits.

Competing gas and electric utilities and regional power producers, both investor owned and publicly owned utilities were able to cooperate and overcome their traditional institutional barriers. Fuel policies and resource acquisition strategies of each coalition member were in sync due to regional needs. All parties agreed on schools as a targeted sector for energy efficiency. The priority placed on this effort by the Superintendent of Public Instruction established a unprecedented receptivity by schools towards energy efficiency.

Endnotes

1. Letter to Portland General Electric from the Superintendent of Public Instruction, Oregon Department of Education which asked utilities to help reduce school energy costs.
2. Curriculum enhancements from the National Energy Foundation such as *Teach With Energy!* (1984-1991), the Energy Source Education Council's *Energy Source Curriculum Program (1984-1987)*, and *Lab Quest Electric Power* from the National Business Education Alliance, as well as other supplemental energy curriculum resources were reviewed.
3. See *Eugene School District: Case Study of Efficiency using a Matrix of Conservation Opportunities and Completed Projects* (1990), available from the Oregon Department of Energy. The prototype program was funded by the Oregon Department of Energy.
4. *Think Earth* is an supplemental educational resource developed by Education Development Specialists in Lakewood, California.
5. *In Concert with the Environment* is a student administered home energy audit and supplemental educational resource developed by EcoGroup, Inc. in Tempe, Arizona.

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