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# EcoGroup

## In Concert With The Environment®

### Profile #72

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<b>Executive Summary</b>	<b>2</b>
<b>Program Overview</b>	<b>3</b>
<i>Case Study: Wisconsin Electric Power Company Plans Community-Wide Applications</i>	
<b>Implementation</b>	<b>5</b>
<i>Marketing; Delivery: The Step By Step Process; Case Study: Salem Electric Cooperative; Sample Student Handbook Sections Table; Typical Energy Survey Sections Table; Sample Water Heater Survey Section Table; Measures Installed; One EcoWatt Equivalent Table; Staffing Requirements; Case Study: Boston Edison Company; Case Study: Murray City Power</i>	
<b>Monitoring and Evaluation</b>	<b>12</b>
<i>Case Study: Portland General Electric</i>	
<b>Program Savings</b>	<b>13</b>
<i>Participation Rates; Participation Table; Savings Adjustments; Measure Lifetime; Case Study: Union Electric Company; Case Study: University City High School</i>	
<b>Cost of the Program</b>	<b>16</b>
<i>Example Of Program Costs Table</i>	
<b>Lessons Learned / Transferability</b>	<b>17</b>
<b>Regulatory Incentives / Shareholder Returns</b>	<b>18</b>
<b>References</b>	<b>20</b>

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# Executive Summary

**In Concert With The Environment**<sup>®</sup> is an educational program that forges a link between energy use and the environment and has been primarily used for high school students. Developed by EcoGroup of Tempe, Arizona, the program is customized for each sponsor and is now being used by 25 utilities in 17 states for well over 130,000 students creating a win-win situation for sponsoring utilities and their customers.

The program is quite simple as students take home a detailed questionnaire about their home energy consumption, water use, recycling habits, and transportation patterns. The survey probes at energy use by engaging students and their parents in details such as the number, ages, and models of appliances they have in their homes. Back at school students then input the results of the survey into user-friendly software. The sponsoring utility provides full computer services that allow the students to immediately print out a home energy profile and an Action Plan to gather **EcoWatt**<sup>®</sup> Benefits, EcoGroup's term for the environmental advantages of energy efficiency.

The survey provides utilities with a clear indication of baseline energy use in their service territories along with a tremendous amount of data about household characteristics typically not collected by utilities. This information can then be used by utilities to design or refine other energy efficiency programs. Note also that **In Concert With The Environment** can effectively "prime the pump" for later programs, as awareness of energy efficiency is raised through this innovative classroom connection!

After analyzing their data in class, students then take home action plans for their homes. The plan lists the relative costs and benefits of a variety of recommended measures so that families can decide how to proceed. In some cases utilities have coupled the awareness building initiative with free energy efficiency starter kits complete with such items as compact fluorescent lamps, faucet aerators, and high performance shower heads. In other cases, utilities provide information on their DSM programs and incentives to accompany the action plans that students take home.

While investing in tomorrow's energy consumers inherently makes sense, utilities have been reluctant to pay the costs associated with such efforts. **In Concert With The Environment** affords utilities an opportunity to prudently invest in a program carefully designed to capture short-term efficiency upgrades through specific action steps, and long-term value changes through cleverly-designed curricula.

## In Concert With The Environment

Company: EcoGroup

Sector: Educational

Measures: Educational materials, home energy survey, software analysis tool, marketing and other supporting materials

Mechanism: Utility-sponsored educational program for use in schools, corporations, and community groups linking energy use and environmental quality; features energy survey of participants' homes and recommendations for efficiency improvements based on computer analysis

History: First available in 1991

### Program Data (1991-1993)

Utility sponsors: 25

Number of schools: 300

Student users: 135,700

Average cost to the sponsor: \$18-\$25/user

### Conventions

For the entire 1993 profile series all dollar values have been adjusted to 1990 U.S. dollar levels unless otherwise specified. Inflation and exchange rates were derived from the U.S. Department of Labor's Consumer Price Index and the U.S. Federal Reserve's foreign exchange rates.

The Results Center uses three conventions for presenting program savings. **Annual savings** refer to the annualized value of increments of energy and capacity installed in a given year, or what might be best described as the first full-year effect of the measures installed in a given year. **Cumulative savings** represent the savings in a given year for all measures installed to date. **Lifecycle savings** are calculated by multiplying the annual savings by the assumed average measure lifetime. **Caution:** cumulative and lifecycle savings are theoretical values that usually represent only the technical measure lifetimes and are not adjusted for attrition unless specifically stated.

# Program Overview

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**In Concert With The Environment** is owned and operated by EcoGroup, an energy services and consulting firm based in Tempe, Arizona founded in 1991. In September of 1993 EcoGroup was acquired by the Heartland Development Corporation of Madison, Wisconsin. Under its new ownership structure EcoGroup is a business unit of A&C Enercom, a consulting firm also owned by Heartland.[R#3]

EcoGroup designs and implements energy efficiency programs, provides consulting services, and is currently expanding its services as a result of its new relationship with A&C Enercom. Among its newest projects is a new home program focused on environmentally-conscious construction. This “green” construction program is designed to be implemented by utilities with an interest not only in energy efficiency but environmental materials and construction practices. (See Profile #11 for another “green builder” program.) The program is scheduled to be implemented by six utilities in early 1994.[R#3]

The primary product of EcoGroup is the **In Concert With The Environment** program, the subject of this profile. **In Concert With The Environment** was developed over a twelve-month period during 1990 and 1991 with input from the energy, environmental, and education communities in an attempt to develop a program that linked energy consumption to environmental quality in a way that motivated customers to use energy more efficiently.[R#3]

The **In Concert With The Environment** program consists of educational materials, a thorough energy survey for each user to perform at home, and a hands-on computer exercise to analyze the results of the survey using a software tool that has been designed to link energy consumption data with environmental information for each consumer. The program can be used by any group of consumers such as corporations, community organizations, or even utility staff, however it has typically been presented to students in high school. This last application will be the primary focus of this profile.

**In Concert With The Environment** was first introduced in Arizona high schools during 1991 under the sponsorship of Arizona Public Service Company (APS). There the program reached over 20,000 students throughout the APS service territory in its first years.[R#4] The program has spread quickly and there are currently 25 sponsoring utilities in 17 states supporting **In Concert With The Environment** in approximately 300 schools.[R#3]

The costs of implementing the program in the school are borne by the sponsoring utility or utilities. To date, electric, gas, and combination electric/gas utilities have sponsored the program. Utility sponsorship of the program creates a strong public-private partnership that benefits the school, students, and the utility. The school receives additional curricula materials at no cost. Students receive hands-on experience with a computer as well as a detailed profile of their home energy consumption. The utility receives a number of benefits, not the least of which is a closer relationship with its future customers.[R#1]

Each utility receives program materials for use in the classroom as well as a number of pieces for its own purposes. Utilities receive a communication plan to assist in introducing the program to the community, media, and schools. The utility also receives several marketing pieces. An Evaluation Guidebook contains information for designing and implementing evaluations of the program.

The classroom program materials include student handbooks, a comprehensive and sophisticated Teachers Guide, and a take-home energy survey for each student. The student handbooks contain a variety of exercises and activities designed to stimulate thoughts by the students on the linkage between energy use and the environment. The handbooks also contain reading material, quotations, and questions for the students to consider. ☞

## Program Overview (continued)

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The home energy survey allows the student to perform an audit of household energy consumption as well as recycling practices, transportation consumption, and even water efficiency. Given the sophistication of the survey, both students and their parents are engaged in the survey of their house. Students then analyze the results of the survey on a computer in the classroom using software that provides an estimate of the energy, financial, and environmental savings from potential efficiency improvements using a metric of the environmental benefits of efficiency designed by EcoGroup to be easily comparable, the **EcoWatt Benefits**. The software analysis also generates an Action Plan with specific recommendations for

each student's home based on the software's combination of energy engineering data with environmental and customer behavior data.

All **In Concert With The Environment** materials are customized specifically for the sponsoring utility. This customization is particularly important for the take-home energy survey as it allows the utility to tailor the questions to address local conditions such as the use of fuel oil in the Northeast or the abundance of swimming pools in Arizona. Also, the utility receives the results of the energy audits which together provide a detailed snapshot of residential energy consumption in its service territory. ■

### **CASE STUDY: WISCONSIN ELECTRIC POWER COMPANY PLANS COMMUNITY-WIDE APPLICATIONS**

Wisconsin Electric (WE) adopted **In Concert With The Environment** two years ago as the result of a search for a program to reach older students from late middle-school through high school. The utility was particularly interested in the program's explicit linkage of energy use and environmental quality as it felt that this would be a successful strategy to reach school-aged children.

The program was recently evaluated by WE staff with positive results. WE believes that the information from **In Concert With The Environment** is reaching the students and raising their awareness of energy efficiency. The evaluation noted that this information was also getting back to parents and siblings, causing a behavioral change and providing the utility with real energy savings.

With this indication of success in hand, Wisconsin Electric decided to expand the program in the summer of 1993 in an innovative way. The utility has targeted roughly 1,000 families in each of two low-income, ethnic neighborhoods in Milwaukee. Low-income customers have traditionally not been active participants in WE's DSM programs for a variety of reasons, so the utility was eager to see if better information and a heightened awareness of opportunities would spur energy efficiency improvements by these customers.

To initiate the program the utility performed a baseline assessment of energy use in each area. This assessment found that lighting was a major source of energy consumption, in large part due to its use for security. Other minor appliances such as stereos and televisions were also major energy consumers. WE then modified the **In Concert With The Environment** survey questions and the home energy audit software to reflect these local conditions. Many more questions on lighting and appliances were added while water, transportation, and recycling questions were removed to keep the survey from overwhelming the customers. (These are also areas for which WE has no authority.)

The program is being delivered by a local community-based organization (CBO) in each neighborhood. WE provides all the resources, such as computers, for the effort but the CBOs are responsible for reaching the customers. Once customers complete the survey and return their Action Plans noting any intent to implement specific action steps, they become eligible for varying levels of lighting packages depending on energy consumption and commitment to reduce it from the utility. At that time WE will provide various lighting packages at no cost to be installed by local contractors within each neighborhood. The utility has also explicitly linked its other DSM offerings such that Action Plans contain information about incentives for refrigerators, high-efficiency air conditioning, and other opportunities.

If this effort turns out to be as successful as the school application of the program, WE intends to use **In Concert With The Environment** to target energy efficiency throughout its service territory on a community by community basis and to become the cornerstone of WE's educational efforts. [R#17]

## MARKETING

The first stage in marketing and delivery of **In Concert With The Environment** is from EcoGroup to a potential sponsoring utility. The company uses its regional sales force based in Tempe, Dallas, Milwaukee, and Waterbury, Connecticut to sell the service and address the needs of current customers. EcoGroup stresses personal contact with its program sponsors because the company feels the program has generated much of its momentum through the enthusiasm of current sponsors who are sharing their results with others.[R#3]

EcoGroup promotes the program in a number of ways. First, the company undertakes direct marketing efforts to the utility industry. Company representatives attend utility industry events and conferences to promote the program. A quarterly newsletter called “Environmental Stewards” is distributed to current program sponsors as well as potential sponsors to provide information on sponsors’ efforts to incorporate environmental issues into everyday practice as well as updated information on the program. The company also holds an annual 3-day users conference called Natural Connections that brings together current and potential sponsors with professionals from the utility, educational, and environmental fields.[R#3]

## DELIVERY: THE STEP BY STEP PROCESS

### TO THE UTILITY

EcoGroup provides technical assistance to get the program established once a utility has determined that it desires to implement **In Concert With The Environment**. The first step of this stage is a product design meeting with the utility where goals and objectives for the program are defined so EcoGroup can begin to customize the program. Customization includes adding the utility’s logo and other information to student and teacher materials, fine-tuning the energy survey to meet local conditions, and most importantly, adapting the analysis software to account for local climate conditions, rate structures, and environmental concerns. This tuning of the software does not allow a utility to “game” the tool to promote a fuel source although the software can be modified to focus on specific end-uses, such as WE’s modification for lighting. Detailed information on the software tool can be found in the Program Savings section.[R#2,3]

Next, EcoGroup staff meet with personnel at the utility to train them on program implementation. This includes information on the take-home survey and use of the software program and classroom materials. The session features hands-on participation with the program materials. EcoGroup also presents examples of successful implementation and lessons learned by other utilities. The company then discusses methods to select schools and secure the support and participation of these schools.[R#2,3,5]

The utility receives three key benefits from supporting the program. First, the program raises awareness among customers as informed customers are easier to serve with subsequent energy efficiency initiatives. EcoGroup suggests that this awareness has translated to direct efficiency benefits for the utility as consumers who participate install efficient technology. Second, it allows the full range of energy consumption including transportation and recycling to be included, thus broadening the scope of environmental stewardship rather than focusing narrowly on home energy consumption. Finally, the end-use data generated by the participants’ energy surveys can be employed in a variety of ways by the utility, for instance in designing and targeting further demand-side management programs.[R#1]

### TO THE SCHOOL

Once the utility has decided to implement the program it must be delivered in the schools. Typically, utilities deliver the program through an educational services department often located either within the community services or marketing area, or the demand-side management group at the utility.

The location of the delivery group at the utility is important as to how the program is implemented. Utilities can approach the program as either an outreach or public relations effort or a demand-side management program. Generally, the program is delivered with aspects of both as the utility strives to develop better relations with customers while at the same time capturing energy efficiency benefits. EcoGroup has recognized the need for utilities to generate support for **In Concert With The Environment** within the community and has developed a communications plan including press materials that a utility can employ to introduce the program to the community and local media.[R#3] 

### **CASE STUDY: SALEM ELECTRIC COOPERATIVE**

Salem Electric serves 14,000 customers in Salem, Oregon, the capital of Oregon which is located about one hour outside of Portland. Portland General Electric's service territory surrounds Salem and thus the programs that are offered at PGE tend to be noticed by Salem Electric's customers. Therefore the utility has worked closely with Portland General Electric and Northwest Natural Gas as they have also sponsored **In Concert With The Environment**. For example, the three utilities have cooperated on teacher training workshops and shared the use of computers for classrooms.

Walker Middle School is the only target school within Salem Electric's service territory and happens to be six blocks away from the utility's headquarters. It is also a "business partner" with the utility, a relationship that has involved the utility closely in such diverse school activities as judging contests, providing volunteers, and speaking to students about careers. Salem Electric has sponsored **In Concert With The Environment** at Walker for two years and plans to provide it again in 1994 because it is a natural extension of the already close relationship between the school and the utility.

Salem Electric views the program as an information foundation for its future customers. Its staff notes that today's customers will be better informed on the value of energy efficiency through the home energy survey. However, the utility does not attempt to use the information gained from the surveys to push programs onto its customers. Instead, it feels that most customers are already aware of what efficiency services the utility provides and hopes that a better understanding of how energy use effects both the environment and the pocketbook will motivate some action.

The program was initially offered as a pilot program with financial support from the Bonneville Power Administration. With the positive response of both the teachers and the eighth grade students, Salem Electric provided funding for **In Concert With The Environment** last year and will continue to do so next year. [R#16]

When putting **In Concert With The Environment** in place the utility first approaches the school district to establish pilot locations. The choice of schools is dependent on the utility's goals for the program. For example, the utility may select schools where they feel outreach efforts must be improved. Or it may attempt to link the program to other DSM efforts by targeting schools that are demographically aligned with its DSM programs. A third option allows the utility to implement the program in a school where the utility enjoys a very strong relationship already. [R#3]

Benefits to the schools include diversified curricula at no cost and practical, reality-based education for students. EcoGroup has used an Educational Advisory Board to guide its customization of the materials to ensure they continue to meet high educational standards. The original Board was comprised of several volunteers with varying educational, environmental, and energy backgrounds. These individuals included an associate professor at the

Arizona State University College of Education, an energy and environmental consultant affiliated with ASU's College of Engineering and Applied Sciences, a science education specialist, an eighth-grade science teacher, a high school science teacher, an assistant principal and former science teacher, and one of EcoGroup's vice presidents with a utility background. However, this Board was disbanded recently to be replaced by another, more nationally-based group of individuals as a result of EcoGroup's acquisition by A&C Enercom and a desire to continue to expand the use of the materials. [R#2,5]

Once the pilot sites have been selected a workshop is scheduled to present the program to teachers. This workshop typically has two functions. First, EcoGroup provides comprehensive information to the teachers on the materials to be used as well as strategies that have been used in other classrooms. The teachers are led through the program materials and given the opportunity to work on the computer with the software. Second, since all participat-

ing teachers are present they can provide early input and share their own ideas on delivering the program to the students. [R#3]

## TO THE STUDENTS

**In Concert With The Environment** is then presented in the classroom. It begins with an introductory video tailored for each utility. This video usually includes remarks by the utility's Chief Executive Officer and other key personnel on the value of efficiency and its environmental

### **SAMPLE STUDENT HANDBOOK SECTIONS**

#### **Awareness of Energy & Our Environment**

- Environment
- Energy
- EcoWatt Benefit
- Efficiency
- Sustainability

#### **Valuing Our Planet's Resources**

- Life
- Land
- Air
- Water

#### **Commitment, Action, & Impact**

- Input
- Analysis
- Output

#### **Glossary**

#### **Personal Resources**

benefits. The teacher may also present a fast-paced student-oriented video, "Earth Offender," to motivate the students. This video was originally produced by Southern California Edison, however, it has proven to be so successful that it was made available to all program sponsors. It stresses the role each student can play in improving the environment and the responsibility of the individual to do so. EcoGroup has also produced three videos with students demonstrating the program that the utility can supply in the classroom. Additionally, several utility sponsors

including TU Electric, Puget Power, Dayton Power & Light, and Public Service Electric & Gas have created their own student-oriented videos. [R#3,11]

## THE STUDENT HANDBOOK

After the video presentation a utility-supplied facilitator answers questions, passes out classroom materials, and coordinates a date for the computer analysis with the teacher. The classroom material is in the form of a student handbook that includes some reading, thought-provoking quotations and questions, and activities. The material is designed to be interactive by incorporating a number of lessons with some exercises for the students. The handbook is roughly 50 pages long and includes information on energy resources and consumption, environmental issues related to energy use, and a glossary of energy and environmental terms.

## THE HOME ENERGY SURVEY

Students are next given the energy survey to take home. With their parents they complete the 80 to 100 questions on the energy consumption of their homes, their water use, recycling habits, and transportation use. The survey is generally treated as a homework assignment for the students. Its complexity and level of detail usually require the students to involve their parents in filling out answers for such items as the type and age of heating and cooling equipment and amount of gas used in transportation.

Although the basic scope and the underlying methodology of the survey remains constant it may be expanded or contracted as necessary to meet the specific requirements of the local area. For example, provisions for oil heating are incorporated in the Northeast but not in other areas of the country where oil heat is not widely in use. Except where a utility specifies otherwise, potential gas and electric savings are calculated separately to avoid any consideration of fuel-switching. Utilities that are willing to allow fuel-switching are able to have the software aggregate gas and electric measures by total operating cost. ☞

## Implementation (continued)

Students are given a varying amount of time to complete the survey depending on the teacher's preference, but typically ranging from a few days to less than two weeks. When complete, the answers to the survey questions are entered in a computer by the students during class. The computers are usually desk-top personal computers including a monitor and a laser printer provided on loan to the school by the utility.

### SURVEY OUTPUTS

The students are able to analyze the results of the survey using the **In Concert With The Environment** software analysis tool that has been installed on a desktop personal computer provided by the sponsor. The number of computers in any given class varies according to the number of students and the number of classes at a school that are running the program at any one time. Each student enters the data from their survey into the computer and immediately receives a printout from the attached printer. The results of the analysis include a detailed profile of the current energy consumption of each participating student and an **EcoWatt Benefits** Report detailing recommendations for improving that consumption with a quantification of the environmental and financial benefits of each specific improvement.

**EcoWatt Benefits** are a measure that was developed by EcoGroup to allow an easy comparison of the environmental benefits of energy efficiency. The benefits of various energy savings differ regionally based on climatic, geographic, and generating fuel mixes of program sponsors. For example, the saving of only 6.3 kWh in Hawaii provides one **EcoWatt Benefits** equivalent to the saving of 55 kWh in Oregon due to the different environment impacts associated with the generation of those kilowatt-hours, with the value of each kWh higher in Hawaii than Oregon because of the costs associated with shipping the fuel, among others. The benefits associated with recycling of specific products are constant throughout the country because these products are typically centrally-manufactured using the same amount of energy. (See One EcoWatt Equivalent table on page 10.)

Students are encouraged to sit down with their parents to discuss the results of the energy survey and the recommendations contained on the report. EcoGroup has

<b>TYPICAL ENERGY SURVEY SECTIONS</b>	
Utility Information	Name, rate schedule
Home Information	Type & size, insulation
Heating & Cooling	Fuel, equipment, age
Water Heaters	Type, age
Water-saving Devices	Showerheads
Dishwasher	Usage, efficiency cycle
Clothes Washers & Dryers	Usage, fuel, type
Refrigerators	Number, age, size
Freezers	Number, age, size
Ranges/Ovens/Microwaves	Fuel, usage
Waterbeds	Number, size
TV/VCR/Stereo/Computer	Usage
Small Appliances	Types, usage
Lighting	Wattage, usage
Pools, Spas, & Hot Tubs	Fuel, usage, location
Other Appliances	Types, usage
Landscaping	Shading, irrigation
Transportation	Cars, mileage
Recycling	Materials

also developed an Action Plan for participants intended to gauge the commitment of program participants while making their decisions easier. The Action Plan is designed to complement the report detailing the results of the home energy survey by translating the recommendations of the survey into specific actions the household may undertake. The Action Plan contains a checklist of potential efficiency improvements and their relative **EcoWatt**

<b>SAMPLE WATER HEATER SURVEY SECTION</b>	
Please answer the following questions for each water heater you have.	
<b>Type of Fuel Used</b>	
1. Natural gas	5. Heat pump
2. Electric	6. Solar with natural gas backup
3. Propane gas	7. Solar with electric backup
4. Oil	8. Solar with propane backup
<b>Water Heater Tank Size</b>	
1. Small--less than 45 gallons	
2. Medium--45 to 80 gallons	
3. Large--over 80 gallons	
4. No tank (tankless water heater)	
<b>Is it in an area that is heated and cooled with the rest of the house?</b>	
1. Yes	2. No
<b>Is this water heater a high-efficiency model or covered with an insulating blanket?</b>	
1. Yes	2. No
<b>Is this water heater less than two years old?</b>	
1. Yes	2. No
<b>What is the temperature setting of this water heater?</b>	
1. Less than 130 degrees Fahrenheit	
2. 130 degrees to 139 degrees Fahrenheit	
3. 140 degrees Fahrenheit or greater	

**Benefits** with space for the user to initial specific activities that are completed or to which the household has committed. These recommendations are suggestions for general improvements, such as adding ceiling insulation or reducing commuting miles based on each student's energy consumption. Utilities can tailor the plan to have it returned by the participants, include a phone number or address for further information, or even use the results to

tailor their mailings of information on other DSM efforts. [R#2,11]

### POST-IMPLEMENTATION

The utility then has access to a detailed profile of the residential energy use in its service territory from EcoGroup's database. This information can be used to forecast load growth and consumption trends. It can also be used to develop and implement DSM programs by targeting incentives and efforts to the specific needs of the customers. In fact, it is this linkage that offers the greatest opportunity for the utility to capture immediate efficiency resources as both the students and the parents have increased awareness of energy usage from their participation in the program and should be responsive to other utility initiatives designed to improve their energy efficiency. Over the longer term, value and behavioral changes inspired by the program offer tremendous potential for savings. [R#1]

There is a toll-free line staffed by EcoGroup available for teachers and students to call at any time during the process should they have any questions on the classroom materials or the energy survey. The entire process can take less than two weeks or can be prolonged at the discretion of the teacher to incorporate specific lessons into the overall lesson plan.

### MEASURES INSTALLED

Some utility sponsors of the program have attempted to explicitly link the education delivered by this program and their other residential demand-side management programs that promote the installation of efficient technologies. These utilities, notably Portland General Electric and Wisconsin Electric Power, are targeting incentives for residential customers along the lines of the educational materials presented in school so that when students encourage their parents to make energy upgrades the utility is able to assist with those improvements by providing funding or technical expertise. In addition to providing incentives in line with the recommendations of **In Concert With The Environment**, Portland General Electric provided 1,700 low-flow showerheads and faucet aerators at no cost to students to install in their homes resulting in both energy savings and water conservation. [R#6] 

# Implementation (continued)

<b>One EcoWatt Equivalent</b>	<i>Electricity (kWh)</i>	<i>Natural Gas (Therms)</i>	<i>Water (Gallons)</i>	<i>Aluminum (Lbs)</i>	<i>Glass (Lbs)</i>	<i>Paper (Lbs)</i>	<i>Oil (Quarts)</i>	<i>Plastic (Lbs)</i>	<i>Miles Undriven</i>
Arizona	15.00	7.60	625	0.36	200	9.60	23.60	0.35	3.50
California, N.	26.00	4.90	1,111	0.36	200	9.60	5.60	0.35	3.15
California, S.	14.00	3.70	667	0.36	200	9.60	6.00	0.35	3.20
Hawaii	6.30	1.80	256	0.36	200	9.60	10.40	0.35	3.00
Illinois	16.00	4.30	625	0.36	200	9.60	13.20	0.35	2.50
Massachusetts	20.00	7.00	769	0.36	200	9.60	12.00	0.35	3.00
Michigan	14.00	3.80	526	0.36	200	9.60	10.40	0.35	3.25
Missouri	16.30	7.20	345	0.36	200	9.60	18.40	0.35	3.30
New Jersey	15.00	6.40	435	0.36	200	9.60	12.80	0.35	2.50
New York (Upstate)	14.00	5.00	556	0.36	200	9.60	6.00	0.35	3.00
Ohio	12.00	7.20	286	0.36	200	9.60	22.00	0.35	3.30
Oregon	55.00	3.70	2,000	0.36	200	9.60	6.40	0.35	2.25
Texas	23.30	4.20	362	0.36	200	9.60	4.40	0.35	3.25
Utah	17.00	7.80	667	0.36	200	9.60	28.00	0.35	4.50
Washington	33.00	7.10	1,250	0.36	200	9.60	17.20	0.35	3.25
Wisconsin	14.00	3.80	526	0.36	200	9.60	10.40	0.35	3.25
U.S. Average	20.00	5.50	695	0.36	200	9.60	13.09	0.35	3.15

Other utilities, while not explicitly linking the program to their DSM efforts, have packaged the program with conservation kits that students can take home at no charge. For example, Boston Edison distributes three compact fluorescent lamps to each participating pupil and as a result of the program has placed at least 6,000 lamps in customers' homes to date. Pacific Gas & Electric provides coupons and rebates for diverse items ranging from showerheads to water heater wraps.[R#3] The installation of these energy-efficient technologies provides the utility with direct savings while validating the educational activities to the students and illustrating the benefits of efficiency to their parents.

### STAFFING REQUIREMENTS

Each utility has designated a program manager for **In Concert With The Environment**. Additionally, most utilities have at least one field staff for assisting in the use of the computers or training the teachers. The number of

staff varies with the number of schools and students that the utility is attempting to reach. Most of these individuals also have other educational or community relations responsibilities while some also have additional demand-side management duties making them less than full-time equivalents for the program alone. For example, Dayton Power & Light uses volunteers from throughout the company to visit the classrooms.[R#20]

EcoGroup has 39 employees of which 23 work in the technical, environment, and customer services group on the program's development and delivery. The remaining 16 employees are involved in marketing, sales, and administration. It should be noted that none of the employees works solely on the **In Concert With The Environment** program although it is the company's primary service.[R#3] ■

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### **CASE STUDY: BOSTON EDISON COMPANY**

Boston Edison (BECo) implements a number of educational initiatives and uses a peer review group made up of teachers for all its educational programs. The utility also distributes a catalog of available curricula enhancement materials for K-12 grade classes on energy issues. Its service territory is characterized by heavy recycling, high fuel oil heating costs, and very expensive water due to the federally-mandated clean-up of Boston Harbor. Thus the population is highly aware of these issues.

**In Concert With The Environment** is in its second pilot phase at BECo and is due to be expanded to all schools in the utility's service territory in March of 1994 if funding permits. To date the program has reached roughly 20 schools and 3,500 school children. The program typically runs for 7-10 days with a full-time BECo employee in the classroom whenever the computers are in use. The utility also does lighting demonstrations in the classroom which are reinforced by the distribution of three compact fluorescent lamps per student. Further reinforcement is provided by the utility's attempts to use the retrofits it has performed in schools to illustrate the benefits to students of efficiency.

BECo has used surveys to evaluate the program and has found that all the participating teachers to date would like to continue to offer the material. The program is used as an educational tool by BECo and therefore the utility has made no attempt to quantify its energy benefits.[R#13]

### **CASE STUDY: MURRAY CITY POWER**

Murray City Power serves 30,000 customers in a rural suburb of Salt Lake City nestled within Utah Power & Light's service territory. Although the utility has no immediate concerns about energy or capacity supply, the community is very interested in energy efficiency as a means of environmental management. Education is viewed at the utility as the best energy efficiency expense.

The utility has sponsored **In Concert With The Environment** for two years reaching slightly over 400 students in the first year and 600 in 1993. Originally the program was presented in the high school and both junior high schools, but has now been placed at only the junior highs to avoid catching students twice.

Murray City uses a unique relationship with the National Energy Foundation, a non-profit energy education organization in Salt Lake City, to deliver the program. NEF does the teacher training and program administration under contract to Murray City. As many of NEF's employees are former teachers, the utility feels that they are best able to communicate with current teachers. (See The Results Center topical paper on School Programs for more information on NEF.)

In Murray City, education and information are viewed by the utility to be the fundamental paths to improved energy efficiency. As such the utility has presented **In Concert With The Environment** to the local Rotary Club, but with somewhat disappointing participation. To overcome that problem, the program will offered in courses at the local library next year so that participants will be involved specifically to get the information contained in the program. Murray City is also considering a small incentive of a \$15 bill credit for customers that complete the handbook and return a finished energy survey.

As the utility has no incentive programs, **In Concert With The Environment** has not been linked to other residential incentives. However, the utility is developing a newsletter for all "graduates" of the program to continue to provide them with good information on their energy use, as well as to demonstrate that the utility is truly interested in its customers' energy efficiency.[R#15]

# Monitoring and Evaluation

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## MONITORING

Since the **In Concert With The Environment** program is not a technology-oriented program its monitoring component does not resemble a traditional utility DSM monitoring effort. Instead, each utility tracks student participation as the basic measure of progress and can use the surveys that are returned as measurements of this progress as well.

Those utilities that have explicitly linked their DSM efforts to the program have a means to monitor the program by subsequently tracking the level of participation in their residential DSM efforts. A sophisticated tracking system will allow these utilities to attribute increased residential DSM activities to the **In Concert With The Environment** program or other factors.

## EVALUATION

EcoGroup provides each sponsoring utility with an "Evaluation Guidebook" for **In Concert With The Environment**. The Guidebook includes suggestions for designing and interpreting a thorough evaluation of the program including student and parent surveys, load research protocols to track changes in residential energy consumption, and behavioral tracking. Finally, the Evaluation Guidebook contains a sample survey upon which utilities may model their evaluation.[R#7]

EcoGroup stresses the importance of a long-term perspective when evaluating the program noting that it has been designed to capture long-term savings by affecting a change in the behavior of participants. This behavioral change will hopefully lead to persistent savings rather than those gained from the temporary replacement of inefficient equipment.[R#7]

The Evaluation Guidebook also stresses the effect of the program on other DSM programs. The Guidebook notes that an effective presentation of the program in the classroom should bear noticeable results in other residential efforts as students take their education home to motivate their parents. Utility regulators, while accepting this argument in theory, have yet to address the ramifications of education on savings from other DSM programs. A more detailed discussion of this and other relevant issues can be found in the Regulatory Incentives and Shareholder Returns section of this profile.

EcoGroup further stresses that the environmental benefits of its program, most clearly delineated in the linkage between energy consumption and environmental quality, merit consideration when evaluating the program. Noting the motivation of consumers by environmental concerns, EcoGroup suggests that its program can effectively move consumers to choose efficiency. Thus EcoGroup views the program as a demand-side management effort with an educational component rather than an educational program with demand-side benefits.[R#7] ■

### CASE STUDY: PORTLAND GENERAL ELECTRIC

A preliminary process evaluation of the **In Concert With The Environment** program as run by Portland General Electric was performed in 1992 by the Gilmore Research Group to evaluate the effectiveness of the program from both the students' and parents' perspective and to determine whether the material was effective at changing the energy use of both parents and students. The survey consisted of 1,200 telephone interviews, 600 with participating students and 600 with their parents. Of these, 540 were matched sets of students and parents. A large majority of the students completed the work involved and felt they had learned from the materials. A similar number of the parents remembered the program and were involved in the helping their children with the audit of their home. The potential energy benefits of the program were also encouraging, as better than one in three parents purchased energy savings devices (typically furnace filters) and a majority of students and parents reported behavioral changes to improve energy efficiency.

A similar study of the program was performed to determine teacher acceptance of the educational materials and suggestions for the program. The majority of teachers felt the program was valuable from an education perspective, particularly at presenting information on specific energy issues, for instance electricity versus gas usage. Most teachers felt that basic environmental issues such as recycling were already covered in class. The materials used in class were generally well received as were the special presenters of the material. This evaluation led to two significant modifications for the Spring 1992 pilots by PGE, providing better information to the teachers before presenting the material and using science classes as the forum for the material.[R#6]

**Data Alert:** This section presents the fundamental assumptions used by the program in estimating the energy savings potential for the residences of participating students rather than quantified energy savings from applications of the program. These are general assumptions that can be customized for each program sponsor.

Student participant savings are based on the home energy survey and subsequent computer modelling. As noted in the Implementation section each student has the opportunity to perform a detailed survey of their own home and to then enter data from that survey into a computer. The computer uses EcoGroup's software analysis program, customized for each utility sponsor, to calculate the energy consumption of the students' home and provide recommendations for improving energy efficiency. The software uses the following methodology to calculate energy consumption and estimate savings potential on a per home basis.

When the **In Concert With The Environment** program was being developed it was decided to attempt to calculate household savings in two different ways. The first makes use of historical energy consumption data for each household. If this information is available the program uses it to establish heating, cooling, and consumption baseload requirements. The baseload is then proportioned to the major end-uses and then savings potentials of these baseline uses are determined. Where this information is unavailable, a theoretical tool is employed to model consumption using a heating and cooling methodology based on the Sol-Air Temperature method outlined in ASHRAE Fundamentals. In either method the tool is able to estimate the household energy usage and thus the savings potential.[R#9]

EcoGroup's modelling tool uses an hourly simulation approach. Computer inputs include dwelling type, climate data, envelope characteristics, HVAC equipment type and efficiency, mix of appliances, and energy rate information, along with solar and temperature data. Climate data is taken from the National Oceanic and Atmospheric Administration (NOAA). Solar data is based on hourly direct solar insolation using regional and monthly typical-day values. Additionally, the software attempts to compensate for occupancy effects of the family in the home by incorporating input on the number of occupants to provide an accurate estimate of energy consumption.[R#9]

The computer tool is able to incorporate time-of-use and demand charges for electricity as well as therms of natural gas and gallons of propane or oil when calculating costs. Natural gas and electricity savings are calculated separately in all cases except where fuel-switching recommendations are requested by a utility sponsor. If fuel-switching is requested by a utility then total operating costs are used to calculate dollar savings for participants.

The tool then provides outputs that have been disaggregated for various end-use measures. No credit, however, is given for building system interactions for transportation, recycling, water heating, lighting, HVAC, refrigeration, or water conservation improvements. For weatherization upgrades to the building envelope the upgraded home is compared against the existing home to determine energy savings.

For transportation, the tool makes recommendations equivalent to a five to ten percent reduction in energy consumption by increased use of walking, biking, or ride-sharing. It can also provide calculations on the use of electric vehicles.[R#9]

Recycling benefits are generated by considering the potential for paper, plastic, aluminum, glass, steel, and motor oil recycling and the use of composting against a participant's current practice. Where applicable, cost savings are generated that include refunds for taking materials to a recycling firm or returning them for any available deposit.[R#9]

The building envelope recommendations are based on bringing the structure to code or utility-specified performance levels. Savings are calculated using hourly typical meteorological year data from NOAA and the efficiency of the HVAC equipment. Credit is included for shade screens, window film, awnings, and shade trees. Energy savings are not calculated if a solar heating system is already present in the home.[R#9]

Appliance potential savings compare a new refrigerator to a pre-1980 model and can also adjust for the presence of two units by calculating the reductions from consolidation to a single unit.[R#9]

Heating and cooling equipment is considered for replacement to standard current technology with the savings potential based on permanent thermostat settings of 68° F winter and 78° F summer. Provisions for ➡

## Program Savings (continued)

equipment cycling are included but only on a day or night basis as opposed to interruptible service. Proper maintenance provisions are credited by incorporating a five to ten percent heating and cooling benefit. [R#9]

The replacement of incandescent lamps with fluorescents is the basis for potential energy savings from lighting. Security lighting on motion sensors receives further credit. Delamping and other lighting measures are not evaluated. [R#9]

Water heating savings are based on the installation of a wrap for units of older than two years, reduction of hot water use through thermostat setback to 130° F or 120° F (if there is a dishwasher with a water temperature booster), and the use of a lower setting for clothes washing. The computer tool can also credit energy saver cycles on dishwashing appliances and the use of a front-loading washing machine, calculated as a 40% savings. The effects of the presence of heat pump water heaters and desuperheaters can also be calculated. [R#9]

The use of electricity during off-peak periods is also considered when generating cost saving potentials. The tool can calculate savings based on shifting appliances to off-peak to take advantage of time-of-use rates. [R#9]

Water conservation is evaluated by the number of low-flow showerheads, aerators, and toilet dams present as well as the use of a front-loading washing machine. [R#9] The computer tool can generate a baseline for outdoor water consumption based on average evaporation rates and local climate conditions by considering the type of irrigation in place, climatic conditions, and total land area. Calculations for the energy requirements to move 1,000 gallons of water (including energy consumption related to pumping) are used to suggest improvements to irrigation systems and time of watering that will result in both energy and water savings. [R#10]

### PARTICIPATION RATES

There are currently 25 utilities sponsoring the **In Concert With The Environment** program in roughly 300 schools. EcoGroup estimates that 135,700 students have been through the program since its inception, with 20,800 in 1991, 50,700 in 1992, and 64,200 to date in 1993. Many sponsors that signed on to the program in 1993 will be ramping up their delivery efforts in 1994, thus significantly increasing the number of students enrolled. [R#3]

<i>Participation</i>	<i>Utility Sponsors</i>	<i>Students</i>
1991	6	20,800
1992	9	50,700
1993	10	64,200
Total	25	135,700

### SAVINGS ADJUSTMENTS

Although the **In Concert With The Environment** program itself presents no savings adjustment considerations of substance, its linkages to other DSM efforts raise a number of interesting questions. First, the issue of free riders and free drivers must be considered in light of an increased awareness of energy efficiency as an economic and environmental advantage for program participants. Namely, it seems reasonable to assume that the effective presentation of the program will result in more energy-efficient consumers as the program participants will have an increased understanding of the value of efficiency. Should these customers then choose to participate in the utility's other DSM programs, might they be more likely to do so only for the utilities' incentives? Conversely, better educated consumers may choose to improve their energy efficiency but not participate in the utility's DSM efforts, thus becoming free drivers.

The other major issue related to energy savings associated with this program is the persistence of any savings that accrue. As noted earlier, the savings from an educational program that successfully motivates its participant to undertake a fundamental change in his or her behavior are likely to be permanent, or near-permanent for all practical purposes. These savings are therefore more valuable than the savings captured in traditional technology-oriented DSM programs that are vulnerable to both takeback and snapback.

### MEASURE LIFETIME

While many of the efficiency measures implemented as a result of the program may have persistence limited to the life of the measure, such as lighting applications or showerheads, improvements that require behavior modification such as setting back the thermostat are likely to be more persistent. ■

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### **CASE STUDY: UNION ELECTRIC COMPANY**

Union Electric (UE) delivered **In Concert With The Environment** to roughly 4,000 families in early 1993 and performed a program evaluation in July. The evaluation revealed that more than half of the participants returned an action plan to the utility with details of intended efficiency improvements. Over half of the respondents noted their intent to implement an average of three common measures: thermostat setback, water heater wrap, and efficient lighting. [R#3]

The evaluation stated that total savings that the participants indicated commitment to secure were 6,256,872 kWh of electricity, 427,233 therms of natural gas, 28,274,323 gallons of water, and 694,534 gallons of petroleum. Of the electricity savings, 1.2 million kWh were through direct conservation in homes and the remainder can be attributed to recycling. [R#3] This level of savings calculates to 300 kWh per home in direct energy savings with additional savings of 1,264 kWh from recycling improvements. Recycling benefits are large in comparison to residential efficiency potential improvements due to the relatively high level of energy intensity inherent in manufacturing glass, aluminum, and paper (and thus the large potential savings from recycling) as compared to the comparatively low energy intensity of the average home. Each participating household also gathered average savings of 107 therms of natural gas, 7,069 gallons of water, and 174 gallons of gas.

### **CASE STUDY: UNIVERSITY CITY HIGH SCHOOL**

Beverly Frazier, the Earth Sciences teacher for University City High School in St. Louis, Missouri was approached by Union Electric Company with the opportunity to present **In Concert With The Environment** to her 9th grade class last year. She and other participating teachers first attended a one-day training session hosted by the utility and EcoGroup. All the teachers were led through the student and teacher handbooks and given the opportunity to run the software. An EcoGroup representative was able to point out spots where other teachers and students have encountered problems or asked questions and provided Ms. Frazier with some ideas for those situations.

The material was presented to the students over a two and a half week period beginning with some basic activities on energy resources and uses and progressing to the computer activity. Union Electric provided six to eight computers for the class (the number varied with the number of classes in the school involved on a given day) for the students to enter the results of their home energy surveys. While some students were working on the computers the others were able to do group exercises from the handbook.

Typically it took each student 15 to 20 minutes to enter their data. They were then rewarded on the spot with individualized **EcoWatt Benefits** reports and Action Plans for their homes printed on the laser printer attached to the computer. Ms. Frazier noted that these immediate results were important to the students as each could see the output of their own efforts. More than 80% of her students' parents were involved in the survey and Action Plan steps of **In Concert With The Environment**. Of course, bringing back the Action Plan was part of the course's final exam!

Ms. Frazier commented that she no longer implements the program as it was presented in Environmental Science class at University High School this year. However, she went back to the teacher training session and was pleased to see the student materials had been improved to add more hands-on activities and basic science skills such as graphing. She feels like the 2.5 weeks spent on the program could easily have been stretched to a month by integrating the activities with the traditional science textbooks. The school is likely to continue the program as long as the utility supports it because it comes at no cost. Her final comment was that although **In Concert With The Environment** may not stimulate every student to take action, it certainly makes them more aware of the issues. [R#14]

# Cost of the Program

<b>Example of Program Costs</b>	<i>Participants</i>	<i>Total Program Cost (x1000)</i>	<i>Cost per Participant</i>
Year 1	3,000	\$53.9	\$17.95
Year 2	5,000	\$89.8	\$17.95
Year 3	10,000	\$179.5	\$17.95
Year 4	10,000	\$179.5	\$17.95
Year 5	10,000	\$179.5	\$17.95
<b>Total</b>	<b>38,000</b>	<b>\$682.1</b>	

**Data Alert:** Costs to each program sponsor differ and thus in this section The Results Center illustrates how these costs are set and adjusted. Also included is a hypothetical case study to illustrate the cost of the program.

## **COST TO THE SPONSOR**

There are two basic charges for using **In Concert With The Environment**. First, the program development charge covers EcoGroup’s efforts to set up the program at a specific utility. The second charge is a volume charge for the number of students expected to participate on a yearly basis. [R#4]

The program development charge covers EcoGroup staff time at the utility where training is provided by EcoGroup on all facets of program implementation including the audit software. This cost also includes the customization of the computer software and program and marketing materials as well as video modifications and

new artwork if necessary. The amount of this charge is based on the size of the sponsoring utility, measured in this case by the utility’s number of residential customers. [R#4]

The volume charge is determined using a sliding scale based on the number of students expected to participate in the program. This charge is intended to cover the costs of the materials necessary for those students including the computers used in the classroom. [R#4]

The attached table illustrates the costs associated with implementing the program and ramping it up over a five-year period. These cost figures include the program development charge and the volume charge. This example assumes a five-year program for a utility with 750,000 to 1,000,000 residential customers serving 38,000 students.

## **COST PER PARTICIPANT**

EcoGroup notes that while exact charges for each sponsoring utility have been and will be different the average cost ranges from \$18 to \$25 per student. The range presented is effective only if the sponsoring utility commits to a multi-year program because the program is comparatively less expensive each year it is implemented due to the first cost of the program development charge. The costs for a single-year program, however, may be higher. [R#4] ■

# Lessons Learned / Transferability

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## LESSONS LEARNED

Perhaps the most important lesson to be taken from EcoGroup's **In Concert With The Environment** program is the value of a link to the environment in efforts to improve energy efficiency. The program makes use of **EcoWatt Benefits** to demonstrate the relative value of a number of different efficiency improvements in environmental terms. EcoGroup believes that the use of one common term is effective for consumers seeking to understand the relative importance of various energy- and resource-saving activities. EcoGroup and the program's sponsors have found students and other participants to be receptive to the environmental information and willing to take action on that comparative basis rather than the energy savings potential alone.[R#3]

Additionally, the use of the **EcoWatt Benefits** to address a range of energy efficiency improvements broadens the focus of the program beyond traditional utility responsibilities for electricity, natural gas, or water. Responsibilities for savings are thus diffused to other organizations that can be encouraged to support the program. Perhaps the best example of shared responsibility is occurring in Oregon where a host of organizations are collaborating on a wide range of energy efficiency and educational projects including the **In Concert With The Environment** program. (See Profile #68, Portland General Electric, Energy Smarts for Schools)

Another major lesson learned relates to program participation. EcoGroup has successfully designed a program that allows the student to do the work while engaging their parents in the process. The hands-on approach embodied in the energy audit enhances the value of the educational materials that are presented by tying classroom material to action at home. Participation by parents in answering audit questions and implementing efficiency measures effectively closes the loop for this program. The utility is able to reach parents through the students while parents are able to learn with their children.

The program represents an intriguing opportunity for collaboration between traditionally competitive gas, electric, and water utilities. Given the neutrality and flexibility of the energy audit, these organizations have the ability to leverage their resources while delivering overall energy efficiency improvements to their customers. This model has worked in Oregon as noted above and will soon be tested

in Washington by an electric utility in conjunction with the local water authority. Utilities may also collaborate with the state energy office or the transportation office as has occurred with Central Illinois Light Company.

As stressed in this profile, the program can be adapted to reflect the demographics and particular concerns of its sponsors. This program flexibility exists on two levels. The program itself can be refined to address local energy or resource characteristics such as water shortages or alternative heating fuels and can be presented so that participants are most likely to identify and comprehend its message. The program can also incorporate varying ethnic groups as program materials have been translated into Spanish, for example, for students in Arizona, Texas, and California. Because the materials are customized, each utility pays for the costs of translating its specific materials. Although Spanish is currently the only language other than English in which the program has been presented, some preliminary consideration of both Cantonese and Vietnamese is underway.[R#3]

## TRANSFERABILITY

The program is obviously highly transferrable as it has been designed to be adopted across the country in a variety of situations. As noted earlier the program is customized for each sponsoring utility to reflect specific local market considerations. Further, **In Concert With The Environment** has been used not only in schools but by corporations and community organizations. Several sponsoring utilities including Hawaii Electric Company, Arizona Public Service, Boston Edison, Union Electric, and Central Illinois Light have delivered the program to their own employees. Portland General Electric has even implemented the program in the headquarters of The Nike Corporation.

The underlying concept of an energy and environmental education is also extremely transferrable. The Results Center recently completed a topical paper exploring the numerous activities underway to improve energy efficiency in schools through both educational efforts and facility improvements. "School Programs: Improving Today's Schools and Educating Tomorrow's Consumers" contains a resource and contact guide for the organizations involved in this area. ■

# Regulatory Incentives and Shareholder Returns

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Traditional utility ratemaking, where each and every kilowatt-hour sold provides profit, is a major barrier to utilities' implementation of energy efficiency programs. Several state regulatory commissions and their investor-owned utilities have been pioneers in reforming ratemaking to: a) remove the disincentives in utility investment in DSM programs, and b) to provide direct and pronounced incentives so that every marginal dollar spent on DSM provides a more attractive return than the same dollar spent on supply-side resources.

The purpose of this section is to briefly present exciting and innovative incentive ratemaking mechanisms where they're applied. This we trust, will not only provide some understanding to the reader of the context within which the DSM program profiled herein is implemented, but the series of these sections we hope will provide useful snapshots of incentive mechanisms being used and tested across the United States. (Note that the dollar values in this section have not been levelized.)

**In Concert With The Environment** is offered by a number of utilities including investor-owned, municipal, rural cooperatives, and gas local distribution companies and is therefore subject to a number of differing regulatory contexts. The purpose of this section is to present the key issues surrounding regulatory treatment of this type of effort and an overview of how the program is generally treated by utility regulatory commissions.

## COUNTING THE SAVINGS

Utilities face the intriguing task of trying to reasonably evaluate the energy impacts of educational efforts. While utility sponsors recognize that there is a quantifiable energy benefit to be gained from this kind of program, they are largely unable to accurately gauge the magnitude of this benefit. This uncertainty stems from an inability to measure and quantify the effects of behavioral change

with any degree of certainty. What happens in students' homes in the short, mid, and long term is difficult to track, and especially difficult to attribute to a curriculum program.

This basic obstacle is important because of the regulatory structure of investor-owned utilities. Municipal utilities also face the same uncertainty related to program effect, but it is less important due to their different regulatory context. Regulators are unlikely to provide investor-owned utilities with lost revenue adjustments and shareholder incentives without credible evaluation of program impacts, and without these forms of compensation, many utilities are unlikely to invest heavily in schools.

There are several evaluations of **In Concert With The Environment** completed or underway at utilities including Portland General Electric, Wisconsin Electric Power Company, and Union Electric as discussed in this profile. Most of these are process evaluations conducted to determine participation levels. There have also been estimates of the savings from the program as presented in the PGE and UE case studies earlier in this text. However, these evaluations have yet to satisfy some fundamental issues about actual, rather than projected, savings.

## PERSISTENCE OF SAVINGS

Programs that affect a fundamental change in values or behavior have the ability to achieve long-term, persistent savings. Contrary to technological improvements, valid only for the lifetime of the product, behavioral change transcends the installation of any given light bulb ensuring that one efficient product is replaced with another. Thus, while it is difficult to estimate the actual savings from an educational effort, savings that do accrue are likely to be more permanent than those savings garnered from one-shot rebates for equipment replacements.

An assumed high persistence of savings is a fundamental strength of these kinds of programs. When education can be leveraged to traditional hardware-oriented DSM programs, it may mitigate many of the fundamental

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problems associated with technology or hardware oriented energy efficiency programs, notably the loss of savings due to replacement of an efficient technology with an inefficient product (snapback) or increased use of an efficient product resulting in overall higher consumption (takeback).

#### **TREATMENT OF EXPENDITURES**

Utilities are able to expense their educational efforts. The Results Center is not aware of any utilities that are able to include the costs of these programs in the rate base, where the utility's shareholders could receive a return on equity. As yet the savings attributable to education programs remain beyond the ability of evaluators to quantify with any certainty, and thus their costs are generally expensed. [R#8,11,12]

#### **RECOVERY OF LOST REVENUES**

To date, no utilities involved with **In Concert With The Environment** have attempted to attribute noticeable revenue reductions to their educational efforts. As such, none have collected lost revenue adjustments. For example, the Arizona Corporation Commission allows Arizona Public Service to recover the costs associated with implementing the program but does not provide lost revenue adjustments nor incentives for the program because the timing and magnitude of any capacity savings are too uncertain. APS did not request either lost revenue adjustments or shareholder incentives for the same reasons. [R#8]

#### **SHAREHOLDER INCENTIVES**

Regulatory treatment of educational programs varies widely around the country. Perhaps the two extremes for **In Concert With The Environment** are Wisconsin and California. Wisconsin does not currently provide shareholder incentives for any demand-side management efforts by its investor-owned utilities. (See Profiles #24,32) California was among the earliest states to address the issue of shareholder incentives. The California Public Utili-

ties Commission has recognized that educational programs are valuable beyond their energy impacts as they may lead to substantial future efficiency benefits and customer service.

Pacific Gas & Electric is the only utility sponsor of the **In Concert With The Environment** program that The Results Center is aware of with the ability to earn an incentive. In 1993 the program was treated as a residential energy management services program, qualifying it for regulatory incentives under a performance adder mechanism. (See Profile #75 for a fuller description of PG&E's shareholder incentives.) Under this mechanism the utility is able to earn 5% of the actual program expenditures up to pre-authorized budget levels. The program must meet a minimum performance standard, however, there is no penalty for failing to do so. Incentives can be claimed the year following program implementation and collected over a three-year period. [R#18] ■

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Special thanks to Michael Lamp for his guidance and support throughout the development of this profile.