A Multi-Resource Conservation Collaboration at Seattle Public Schools

David Broustis, Seattle Public Schools
David Vanholde, Seattle City Light
Frank Griffin, Seattle Public Schools
Mary Smith, Puget Sound Energy
Phil Paschke, Seattle Public Utilities

ABSTRACT

Seattle Public Schools (SPS), in collaboration with three of their utilities (Seattle City Light, Seattle Public Utilities and Puget Sound Energy), implemented an effective multi-modal, multi-resource conservation program in their facilities. The first two years of the program conserved 7,477,859 kWh of electricity, 451,776 therms of natural gas and 139,715,180 gallons of water, for a total cost savings of $1,438,009 to SPS. Forty-one percent of these savings were estimated to be retrofit-based.

Close coordination between the involved organizations and synergistic methods of resource conservation were key to this program's success. Methods included education, capital projects, and operations and maintenance measures. Educational efforts included a shared-savings program for behavioral-based savings, resource conservation information dissemination to custodial and maintenance staff, and classroom instruction.

Funding, to staff SPS with a resource conservation manager (RCM) for two years, was provided by the three utilities. This was combined with auditing and incentives for capital measures provided by the electric and water utilities, ensuring the school district had the means to identify conservation opportunities and directly implement them. The utilities and SPS also supplied technical staff to the program.

Relationships forged in this collaboration persisted beyond the original program: The success of the program has prompted the school district to hire the RCM after this position's initial funding expired. The utilities have continued to provide incentives as appropriate measures are identified. Finally, behavioral changes should increase persistence and expand the scope of savings beyond the school sites.

Introduction

A diverse approach to achieving energy and water utility conservation substantially reduced costs and use at the Seattle Public Schools. Significant reductions in consumption were obtained through capital, operation and maintenance, and behavioral measures. The project utilized the expertise and financial assistance of key stakeholders to provide cost-effective and persistent conservation savings.

The Seattle Public Schools (SPS) is the largest school district in Washington State. Its stock of over 100 schools and facilities includes buildings ranging from less than a decade old to those dating back over a century. At most of these facilities, few upgrades had taken place over the years, particularly with the goal of reducing utility expenditures. In the 12 month period prior to the establishment of comprehensive conservation activities, the 47,000 student

7,700,000 square foot district spent $4,821,055 for electricity, natural gas, water and sewer utility services.

Stakeholders

The stakeholders in the project were the Seattle Public Schools, Puget Sound Energy, Seattle City Light and Seattle Public Utilities.

Seattle Public Schools (SPS). Also the Seattle School District. The public school district serving the entire City of Seattle. They sought to achieve conservation savings and improve environmental practices in a low-risk, cost-effective manner.

Puget Sound Energy (PSE). The school district's natural gas utility (privately owned). They provided financial support, engineering services and customer service assistance as part of on-going conservation programs and rate tariff obligations from the state utilities commission.

Seattle City Light (SCL). The school district's electrical utility (publicly owned). They provided financial, engineering, and Key Account customer service assistance. Seattle City Light sought to achieve conservation savings from the District as part of its on-going programs and directives from city government to work with the school district. Bonneville Power Administration was represented in the project through its funding of SCL's conservation projects.

Seattle Public Utilities (SPU). The school district's water utility (publicly owned). They provided consulting assistance, and Key Account customer service, and financial incentives for capital projects as part of on-going conservation programs and directives from city government to work with SPS.

Methodology

The backbone of the project was a Memorandum of Understanding (MOU) between the stakeholders to promote resource conservation and provide financial incentives for the installation of capital measures to achieve conservation savings. Per the MOU, the utilities: provided two-year funding for hiring a Resource Conservation Manager (RCM) to promote conservation efforts; allocated start-up funds for technical and support materials; and set a baseline for evaluating the progress of the school district's efforts to develop a shared-savings program for the schools. The school district: hired a RCM; developed a school-based conservation program in more than 20 schools; reported quarterly to the utilities to evaluate progress; and agreed to continue funding the position for two additional years if proven cost-effective.

Renewed emphasis on conservation began as the district prepared to hire the Resource Conservation Manager. In the Fall of 1996, the Seattle School District chose three schools to

participate in the initial pilot of the Green Schools program. The initial implementation of this project was conducted in coordination with the Alliance to Save Energy.[1]

Financial incentives were a key element of the Green Schools pilot. In exchange for committing to become part of the project, the school district agreed to rebate to each of the three schools 90% of that site's behavioral-based savings for each of the two years of the program. In addition to the rebate, between three and six teachers at each school voluntarily underwent training about integrating resource-related topics into the classroom, and received minimal stipends for attending the training and integrating environmental issues into their teaching. The teachers' stipends were provided by the Alliance to Save Energy.

The Resource Conservation Manager was brought on board approximately six months after the beginning of the Green Schools pilot project. Concomitant to the arrival of the RCM, initial preparation took place for the pilot retrofit projects, the scope of which was the installation of resource savings equipment at 15 facilities. These 15 schools comprised Phase 1 of the retrofits. Most of the work performed prior to the arrival of the RCM was accomplished by a handful of school district and utility staff. Within the school district, the Mechanical Coordinator was the key impetus for getting much of the work off the ground.

With the signed agreement and the RCM on staff, Seattle Public Schools began its comprehensive approach to addressing resource consumption issues.

Behavioral Activities

Behavioral activities consisted of low-cost and no-cost actions. Three primary approaches were taken to capture behavioral based savings: audits of bills to identify billing errors and schools with high consumption issues; development of internal incentive programs for the schools/staff, and educational programs provided to students and staff.

Billing audits provided quick information about the consumption histories of buildings without necessitating site visits. The school district was aided in its auditing by the utility staff. Key Accounts representatives were available at the utilities to provide detailed and historical information about accounts, meters, and billing concerns. These individuals were instrumental in alerting the district to buildings with high consumption issues, and assisting with corrections of billing errors. Utility Manager, a utility accounting database program, facilitated the manipulation of data and identification of conservation opportunities at specific sites.

After the pilot year, Green Schools was expanded to 20 additional schools. Each of these schools had the same agreement as the pilot sites. They received 90% of calculated behavioral based savings for the period of two years. A select number of teachers at the pilot Green Schools received stipends for activities during the second year of the program, and no teachers received stipends in the third year.

In the second year of the collaboration, a Custodial Incentive Program was developed. This program included annual awards for those taking exemplary actions to conserve, provided quarterly awards to custodial staff who achieved ongoing savings at their facilities,

[1] Green Schools is a national program sponsored by the Alliance to Save Energy, a Washington, D.C. based non-profit. The general Green Schools concept is to develop a multi-faceted school resource conservation program. Encouraged activities include classroom, and operations and maintenance, and capital measures.

and established a tool incentive program, which returned 10% of behavioral-based utility savings to the custodial staff at each school, to be spent on tools for the site.

Educational programs were developed to disseminate information about conservation to the various individuals at the schools. These programs ranged from structured events to custom-tailored presentations. Specific educational programs included presentations on magnets and motors to fifth grade science classes, a three month video/writing project on resource conservation at the school, and a four hour custodial training for the head custodian at each building.

Operation and Maintenance Measures

Operational and Maintenance (O&M) measures included actions taken to improve the operation of a facility, typically as changes from current practices. In many ways, there is a fine line between behavioral based and O&M measures. For the purposes of this paper, O&M measures include activities such as tuning-up burners on boilers, adjusting energy management controls systems (EMCS) and schedules, and comprehensive changes in practices/procedures by maintenance or custodial staff that required dedicated expenditures or time to achieve the savings.

Capital Projects

The completion of capital projects was a key goal of the collaboration. These projects were intended to upgrade to more resource efficient systems in all schools that were not slated for imminent remodel or demolition. Phase 1 retrofitted systems at 15 schools. With the inclusion of Phases 1 and 2, the projects ultimately included lighting retrofits in 83 facilities, replacing toilets and/or retrofitting urinals in 81 facilities, and installing or upgrading the energy management systems in 25 facilities.

Electricity Financial Incentives. An agreement was made between Seattle City Light and Seattle Public Schools to implement conservation capital measures. No specific cost caps were set on the program, and the utility applied the same conservation incentive cost effectiveness standards to the schools as to its other customers. To streamline the process and reduce contractual overhead costs, an overall contract described as a "Tailored Agreement" (TA) was used as a conduit for energy conservation incentives. Assumptions initially used to estimate energy savings and set aside funds were ultimately found to be very low. For the TA, initial assumptions based on early audits of the schools were:

- 1994 calendar year kWh of 100 schools/facilities to be retrofitted: 50,733,697 kWh.
- SCL estimated a minimum potential of 10% reduction in the schools to be retrofitted.
- Potential savings were based on four initial SCL audits. 90% of the potential savings were expected from lighting retrofits and 10% savings from HVAC controls.
- Potential lighting savings equaled $518,000, based on a funding factor of $0.115.
- Potential Energy Management Control Systems (EMCS) / HVAC savings was equal to $115,000, based on a funding factor of $0.233.

A single firm was selected as low-bidder on both Phase 1 and Phase 2 of the lighting retrofits. For EMCS upgrades, a nationwide controls vendor was selected as a single-source provider for the school district. The electric utility agreed to provide incentives for expansion of the controls work, requiring that the vendor and the district use the utility's standard incentive calculations to justify energy conservation estimates where practical, and allow utility analysts to review proposals for technical merit from an energy engineering standpoint where standard calculations did not exist.

Water Conservation Financial Incentives. Water conservation capital measures undertaken by the district were supported by Seattle Public Utility's incentive programs. The Water Smart Technology (WST) program[2] provided for project cost sharing between Seattle Public Utilities and the school district. Toilet replacements, urinal retrofits and water-cooled refrigerator compressor changeouts all qualified for SPU's incentive programs.

Determining a Consumption Baseline

Reporting of behavioral induced savings was an important consideration for all of the stakeholders. For the utilities, savings helped evaluate the effectiveness of both behavioral based conservation programs, and confirmed retrofit load and kilowatthour reductions. For the school district, confirmation of savings was necessary to justify the continuance of the RCM position, and to confirm the ability to pay for debt incurred to implement retrofit projects with annual utility savings.

The baseline for the project was chosen to be the twelve months prior to the arrival of the RCM. Although baselines often take into consideration two or more years worth of data, it was felt that the 12 months prior to implementation of a program would be a reasonable and accurate reflection of recent use patterns. The chosen baseline represented a typical 12 month period that did not contain any abnormally high or low consumption periods that could over or under-estimate savings.

This chosen baseline, April, 1996, to March, 1997, was used for comparing all utility consumption except for that of the initial pilot Green Schools, which officially began their conservation efforts in September of 1996. For the purpose of calculating savings at the three pilot Green Schools, the baseline was the 12 months prior to the beginning of their conservation efforts.

Behavioral based Savings Calculations

Usage was tracked by utility and compared to the baseline on a monthly basis. Calculations of behavioral based savings varied by utility. For electricity, only the savings from the 23 Green Schools and for specific conservation actions were included. For natural gas, district-wide monthly data were corrected for heating degree days. For water and sewer, savings were calculated district-wide.

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[2] The Water Smart Technology program provided for 50% cost sharing of water conservation projects that were calculated to be cost-effective. The school district also received SPU's standard $150 rebate per installed toilet and retrofitted urinal.

These calculations reflected the fact that behavioral efforts took place districtwide to address natural gas and water consumption. Ancillary electrical savings from more "conservation aware" staff and students at the non-Green Schools were not included in behavioral based calculations because they would have been extremely difficult to sort out from retrofit savings.

Results

Behavioral/Operation and Maintenance Reductions and Savings

Behavioral based savings over the two year collaboration were a significant percentage of the total energy and water savings. Table 1 details the total estimated behavioral savings by utility for each of the two years of the project.

Table 1. Estimated Behavior Based Savings. Includes estimated savings for 23 Green Schools (electric) and water/gas reductions districtwide within two year collaboration period.

Estimated Behavioral Based Savings	1997-1998		1998-1999		Total	
Electricity (kwh)	635,086	$ 22,536	699,440	$ 24,690	1,334,526	**$ 47,225**
Natural Gas (therms)	186,658	$ 80,559	161,880	$ 69,865	348,538	**$ 150,424**
Water (gallons)	54,318,264	$ 349,923	44,545,644	$ 300,433	98,863,908	**$ 650,356**
		$ 453,018		$ 394,988		**$ 848,005**

Electricity: behavioral savings. Much of the promotional work to encourage electricity conservation focused on communicating and acting upon the importance of simple actions taken by individuals: turning off lights in empty rooms, shutting off fans and mechanical systems at night and during breaks, shutting down refrigeration units during the summer months, and turning off other loads such as computers when they were not being used.

Programs were successful in spreading the word to conserve electricity. Many Green Schools did an excellent job of keeping lights, computers and mechanical systems off when not needed and during non-school hours and break periods. The savings included non-retrofit consumption reductions from the 23 Green Schools and consumption reductions specific to savings from other schools that turned off large food refrigeration units during the summer months.

Natural Gas: behavioral savings. Significant natural gas savings resulted from reduced operating hours of the boilers. Because the district had not historically operated its boilers during the evening hours, the captured opportunities were primarily the result of capturing savings on a case by case basis. While the captured natural gas consumption reductions were significant in some schools, the opportunities for savings were minimal at a number of schools since systems had typically been shut off just after the end of school each day. In two schools, smaller package boilers that had remained dormant for years were put back in operation.

Water: behavioral savings. These include adjusting the flow of continuous-flow urinal flush tanks and identifying/repairing water leaks. The flush tanks were installed decades ago to provide a flow of water to wash down urinals. Each tank was a three to five gallon tank which filled by means of a continual water flow controlled by a handle-style water shutoff valve. Each tank served between one and five urinals. When water filled the tank, the mechanism in the tank flushed the water down the urinals. Prior to conservation activities, most tanks filled and flushed 24 hours each day. Conservation actions included reducing the fill rate of the tanks by means of partially closing the shutoff valve, and in many cases custodians shut them off at night.

Because these changes were so simple, water savings began to accrue almost as soon as the RCM was hired. The urinal tank adjustments were a short-term conservation measure until the units were retrofitted. As soon as a school's urinal tanks were retrofitted, the categorization of water savings was shifted from behavioral savings to retrofit savings. Thus, once each unit was retrofitted, savings continued to accrue but were not behavioral based because they were no longer the result of actions taken by individuals to conserve.

The education of building occupants about the importance of reporting water leaks immediately helped to reduce costs by quickly identifying and repairing problems that arose. The maintenance department was educated about the cost of leaks and changed its practices to place higher priority on leaking pipes and valves. Additional savings resulted from scrutiny of irrigation practices. This included checking for and repairing leaks on irrigation systems and adjusting watering schedules where necessary.

By the end of the collaboration period, only a small percentage of water savings were considered behavior based, since retrofits resulted in long term solutions to the majority of the water consumption problems.

Non-quantifiable behavioral savings. Conservation-based educational programs were emphasized by the utilities during the project. Seattle City Light and Seattle Public Utilities provided educational staff who were available to provide classroom instruction. All three utility stakeholders also increased the presence of conservation curriculum in the classroom through the funding of the In Concert with the Environment (ICE) program.[3] Puget Sound Energy also aided in educational efforts for the RCM by coordinating local networking meetings with RCMs from other school districts.

The availability of engineering and conservation consulting assistance from the utilities helped the school district to identify O&M and retrofit opportunities. Performing walk-throughs with utility personnel enabled Seattle Public Schools to tap the expertise of these individuals, which aided in more effectively addressing conservation at other sites.

Capital Measures: Retrofit Savings

Equipment installed under the collaboration substantially reduced both electrical and water/sewer costs for the school district. The details of the estimated savings for years 1 and 2 of the collaboration are included in Table 2.

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[3] In Concert with the Environment (ICE) is a four day conservation program that focuses on home-based conservation activities and includes a home resource audit for the students to complete. It is typically sponsored in schools by local utilities and presented at the seventh or eighth grade level.

Table 2. Estimated Retrofit Based Savings. Includes calculated savings for all schools that underwent retrofits within two year collaboration period.

Estimated Retrofit Based Savings	1997-1998		1998-1999		Total	
Electricity (kwh)	1,787,441	$ 63,426	4,355,892	$ 153,760	6,143,333	**$ 217,186**
Electriciy Demand (kw)	13,413	$ 23,984	22,835	$ 35,667	36,248	**$ 59,651**
Natural Gas (therms)	44,500	$ 19,206	58,738	$ 25,350	103,238	**$ 44,556**
Water (gallons)	2,649,416	$ 16,744	38,201,856	$ 251,867	40,851,272	**$ 268,611**
		$ 123,360		$ 466,644		**$ 590,004**

Electricity retrofits: lighting. The scope of the lighting retrofit projects included the vast majority of lights at all facilities not scheduled for demolition or planned major remodeling. A total of 83 facilities were included, and 65,415 lighting fixtures were replaced or retrofitted. Prior to the project most Seattle schools had original lighting fixtures; thus the vintage of lighting depended on the age of the school. Most lighting was either high-wattage incandescent (200 – 500 W bulbs) in pre-1960's buildings, or pendant fluorescent fixtures in buildings constructed since the 60's. In some areas, high output lamps resulted in lighting levels that were higher than necessary. Existing High Intensity Discharge lamps were located in some gym locations, and were kept in place.

Because of the high lighting density and costs of replacement for lamps, SPS had previously delamped some fixtures and allowed others to go unreplaced when they failed, however ballasts were typically not disconnected when delamping occurred. This lack of consistent maintenance caused some difficulties in establishing valid baselines for calculating lighting measure savings.

Working with SPS facilities staff and utility analysts, the lighting contractor retained by the school district audited all schools to determine the scope, costs and expected utility incentives estimated for each facility. T-8 fluorescent fixtures with electronic ballasts were used extensively throughout the schools, along with screw-in compact fluorescent lamps, and LED exit signs. Sodium vapor fixtures and compact fluorescents were used in outdoor locations. After installation, SPS facilities staff, SCL analysts and the lighting contractor's representatives verified installation of all equipment, made changes as necessary to satisfy the staff concerns, and corrected accounting on the project. The final invoices and lighting incentives were calculated based on the corrected installation accounting.

The 83 school facilities were relit at a total project cost of $5,572,152 and with an energy conservation incentive of $1,871,572, or about 34% of project cost. Lighting efficiency increases and permanent delamping should result in energy savings estimated by SCL to be greater than 15,574,000 kWh/yr. SCL does not consider levelized costs on such standard incentives, but rather pays a fixed incentive of $0.09 /kWh saved on fixture retrofit, and $0.14/kWh on new fixtures. The mixture of retrofit and new fixtures resulted in an average incentive of $0.012/kWh. Phase 2 of the retrofits was completed in November of 1999. Confirmed energy impacts of schools in Phase 2 of the project were unavailable at the time of publication.

In this and other major energy conservation projects coordinated with 3rd party contractors and Energy Service Companies (ESCOs), Seattle City Light has been challenged

to "keep the process honest" when estimating energy savings and incentives expected from the project. The lighting contractor's position as a facility baseline auditor can be skewed by their role as a project developer. The desire to reduce auditing time and thus project overhead, coupled with the desire to maximize incentives to make the project package attractive to the customer, can create a conflict of interest.

During review of the proposed lighting incentive calculations, some schools' facilities were found to have lighting baseline electricity use that exceeded the total metered electric use for the facility. These cases required review and renegotiations between the utility, SPS and the lighting contractor so that scientifically justifiable incentives could be agreed upon. Such review was critical for all parties to ensure the ultimate outcome of the project is as expected. A model that might avoid this problem would use an independent site auditor, selected by the utility, to prepare baseline data for use in preparing 3rd party proposals.

Retrofit lighting savings included all reductions in consumption for the retrofitted non-Green Schools, as well as estimated savings from the retrofitted Green Schools.

Electricity retrofits: controls. Seattle Public Schools and their controls vendor recognized an opportunity to reduce schools' energy use substantially through centralized, automated fan controls. It was also recognized that each Energy Management Control System installed for this purpose would allow many other HVAC systems to be brought under control at low incremental cost, greatly increasing potential benefits from such an upgrade.

Seattle City Light used its Tailored Agreement to help formulate the controls project. A standardized incentive spreadsheet was developed and used for each school, detailing system "existing" and "proposed" operation, energy used in these modes, savings resulting from the changes, equipment costs directly associated with the savings, and SCL incentives calculated using standard engineering methods and the SCL Energy Smart Design Program guidelines.[4]

A total of 25 schools had DDC control systems installed or upgraded, allowing local control by custodians as well as supervisory monitoring, trending and override from the school district's central offices when necessary. All schools included modem connections to the central office. Three hundred eighty-nine fans were brought under automated control at a project cost of $667,921, with an energy conservation incentive of $196,366, or about 30% of project cost.

Fan hours reductions resulted in energy savings estimated by SCL to be greater than 900,000 kWh/yr., at a levelized cost of $0.073 /kWh on an assumed 13 year project life. As noted, savings estimates were based on simple hour reductions multiplied by fan power consumption. While the levelized cost was higher than SCL preferred on such projects, the utility recognized the very large collateral benefits and unquantified energy savings of this project. These included natural gas savings and the installation of a control system with the potential for future expansion at low incremental cost. Installations were completed in summer 1999; completed verification of savings were unavailable at the time of publication. Hours-of-operation trend logs at selected sites indicated the project should exceed the savings estimated as the basis for the incentive.

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[4] Seattle City Light's Energy Smart Design Program guidelines are SCL's standard for calculating incentives available for electricity conservation measures. The guidelines are used to determine incentives for a variety of new construction conservation measures, and in this case for the controls retrofits.

Fan (electric) energy reductions as well as noted improvements in HVAC supply air condition control were being achieved via temperature sensors and damper position and steam coil valve actuators in some schools. Control strategies being applied were appropriate to the heat-only systems. For example, morning preheating was done with outside air dampers closed. At school time the outside air dampers were opened, the amount depending on the outside air temperature. This scheme resembled an economizer operation in heating mode, by increasing outside air from a minimum on cold days to a maximum when outside air temperature was the same as desired supply air temperature, but departed from typical economizer strategies in hot weather by maximizing outside air flow to flush the facility with fresh air. Controls savings for the two years were estimated based on SCL's savings estimates.

Natural gas retrofits. No direct retrofit work was performed on natural gas operated systems during the funding period. However, natural gas use reductions were achieved through EMCS controls retrofit-related boiler operating hour reductions and by boiler load reductions via steam valve controls. These controls allowed automated control of morning startup, staging, and evening shutdown of the boilers. Control of zone steam valves enabled large areas of two schools to remain unheated when not in use. Automation of the system by no means eliminated the need for site-based operation of the boiler systems, but ensured savings through the use of programs rather than relying on the more labor intensive need to open/close and turn on/off systems as weather and occupancies changed. Savings were estimated according to the facilities that received controls retrofits, and corrected for heating degree days.

Tune-ups of 11 burners before the 1997-1998 heating season resulted in efficiency gains up to over 20%. The tune-ups could have been considered behavioral, but were included under retrofits because dollars were directly expended to a contractor to perform the work.

Water retrofits. Toilet and urinal retrofits ensured that short-term actions became long-term water conservation solutions. Phase 2 of the water conservation projects reduced unit costs of the work as compared to Phase 1 by clarifying the scope in contract documents, and included replacing the majority of toilets at each site and the installation of premium quality flush valves that were less likely to leak than existing equipment.

The scope of work for Phase 2 included replacing toilets with low flow equivalents at 62 facilities and retrofitting urinals at 51 sites (some buildings included both elements). Through Phases 1 and 2, a total of 2,216 low consumption toilets were installed and over 500 urinals received retrofits through newly installed flush valves or occupancy sensored tank controls. The retrofitting entailed removing the continuous-flow tanks and installing individual flush valves for each urinal, to be flushed by the user. In a small number of restrooms, retrofitting consisted of keeping the flush tanks in place, with the water fill valve controlled by an occupancy sensor.

A smaller retrofit project also took place, replacing water-cooled refrigeration cooling units with air-cooled models, which continued beyond the two-year funding period. The District received a total of $467,391 in rebates from Seattle Public Utilities, based on cost per

unit rebates for the toilets and urinals, and 50% of projects costs for removing the water-cooled refrigeration units.

Conclusion

This approach to capturing conservation opportunities achieved success as a result of the involvement of multiple stakeholders. Although businesses and school districts often work with local utilities to reduce utility consumption, the multi-modal, multi-resource approach of this project increased the likelihood of success by considering a variety of conservation opportunities. By considering conservation opportunities from multiple utilities, the "low hanging fruit" can be captured, which can help finance and encourage future conservation efforts.

The knowledge that staff from each of the utilities brought to the collaboration facilitated the implementation of the project. Dedicated incentive dollars, utility analyst staff support, engineering/auditing services, educational assistance, and Key Account customer service support all simplified tasks for the school district. The low cost, low risk funding of the Resource Conservation Manager position for the school district resulted in a project that lowered utility costs for the school district and provided reportable resource savings for the utilities, based on retrofits and behavioral/O&M activities. Table 3 shows resource consumption for the baseline, year one and year two. Reductions in consumption over the two year period are reflected in this table.

This collaboration has continued since the ending of the two year funding period. Seattle Public Schools continues to emphasize the conservation of natural resources, and each of the utilities has continued to provide staff support to the district's efforts. Improved maintenance practices, dedicated funding to future, smaller-scale conservation efforts, and expanded emphasis on educating staff and students about conservation will strive to bring a persistent ethic of conserving resources within the Seattle Public Schools.

Table 3. Total District Consumption for Baseline, Year 1 and Year 2 of the Project

Total District Consumption for All Buildings

	Baseline (1996-1997)	Year 1 (1997-1998)	Year 2 (1998-1999)
Electricity (kwh)	48,889,996	46,467,469	43,834,664
Natural Gas (therms)	3,606,955	2,955,216	3,125,953
Water (gallons)	193,313,120	130,530,488	109,817,620