

2008-2009
Resource Conservation Program
Annual Report



Bellingham
Public Schools

...where *every* student learns

Bellingham School District
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Bellingham School District No. 501

MISSION

The mission of the Bellingham School District, in partnership with the community, is to provide students with the knowledge, skills, and qualities required to be successful in a changing, diverse world.

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Mr. Mike Anderson, Buildings & Grounds Manager and Co-Resource Conservation Manager

Table of Contents

Introduction.....	1
Resource Conservation Management Plan.....	2
Resource Conservation Manager Job Responsibilities.....	3
Energy Use Expectations	4
Building Occupant Instructions.....	8
Facility Action Plan.....	9
Electricity Usage Reductions in 2008-09.....	10
Natural Gas Usage Reductions in 2008-09.....	11
Water and Refuse Usage Reductions in 2008-09.....	12
Electricity and Natural Gas Use Comparison by Building.....	13
Future Plans and Conclusion.....	14

Introduction

School District Profile

The largest of seven school districts in Whatcom County, Bellingham covers 97 square miles and has 73,000 residents. Approximately 10,500 students are enrolled in the district. Fourteen elementary schools serve students in grades K–5; four middle schools serve students in grades 6–8; and three high schools serve students in grades 9–12. A small alternative high school is also available, as well as preschool and post-high school programs for students with disabilities.

Bellingham School District has approximately 1,544,429 permanent square feet and 43,200 portable square feet of heated building space. Our oldest building, Whatcom Middle School, was built in 1903 and our newest, Shuksan Middle School, is under construction and scheduled to open in September 2009.

Resource Conservation Program

The Resource Conservation Program is a partnership between the Bellingham School District and Puget Sound Energy (PSE). PSE has provided a grant for \$42,000 to fund a half-time Resource Conservation Manager position. This program is based on a three-year term and requires the district to reduce electricity usage by 3% each year. In lieu of adding FTE, the district appointed two employees, Mike Anderson, Buildings & Grounds Manager, and Brett Greenwood, Business & Finance Manager, as Co-Resource Conservation Managers (RCMs). Both RCMs completed the required training program by PSE and have been successful in implementing the Resource Conservation Program. In addition to electricity, Mike and Brett have broadened the scope of our program to target savings in other resource areas such as water, sewer, garbage, natural gas, and recycling.

Resource Management Plan

Brett Greenwood has taken on the task in the district energy reduction plan by speaking to school administration, building staff, and students about ways they can reduce energy use at their building. The idea is to promote reductions in energy costs and move funds saved on energy to education. His talks focus on reducing energy use by asking people to change their occupant behavior. Changing occupant behavior is as easy as turning off lights when leaving the classroom, turning down the thermostat, and dressing for the weather. He reminds all staff that warmer clothes in winter and cooler clothes in the summer help keep us comfortable while we save energy by reducing heating and cooling loads. He also reminds the occupants of rooms with unitvents to turn them off in the evenings and over weekends unless there is a need to protect the space from freezing temperatures. Custodians assist in that effort, checking each room in the evenings to ensure lights are off, unitvents are on low, computers and monitors are off. Offices are asked to turn off copiers, laminators, and other energy consuming machines when not in use and then make sure they are off when leaving for the day. Custodians double-check those pieces of equipment each day as well.

Brett is also speaking to building administrators and occupants about reducing or eliminating the use of personal residential appliances such as coffee makers, microwaves, refrigerators, portable heaters, etc., that might be in offices and classrooms. Non-building budgets are used to provide commercial coffee makers, refrigerators, and other appliances to building staff rooms so that classrooms and offices can give up their appliances, thereby reducing energy use by reducing the number of energy consuming appliances.

Mike Anderson's role involves the operational side of district actions. The district is lowering most thermostat settings on remote controlled HVAC systems to 68 degrees for heating and raising cooling temperatures to 76 degrees (except in classrooms, where cooling is set at 73 degrees). District plumbers check plumbing fixtures to make sure there are no leaks, grounds employees turn off irrigation systems in the fall and disconnect city service to avoid monthly costs when systems are not in use. District boilers are being tuned to be as efficient as possible during operations. Controls for boilers are set to turn off when outside temperatures reach 60 degrees or higher, allowing lights and other heat sources to warm buildings when outdoor temperatures are high enough. The district has reduced temperatures in buildings after students leave to a mid-point setting and then to a lower night setback level after most staff have left the building for the evening. Mike is also involved with developing, prioritizing, and completing capital projects that address and reduce energy consumption.

Resource Conservation Manager Job Responsibilities

The RCMs' responsibilities are to monitor, analyze, and evaluate utility usage in all district facilities in an effort to minimize operating costs and promote environmental stewardship. In addition, this position will maintain records in accordance with department regulations, district policies, and state, local, and federal statutes and standards as well as maintaining resource use and cost accounting systems to monitor, evaluate, and provide feedback on district utility costs and consumption. This position will also verify meters, accounts, services, and maintain information on district buildings including square footage, building occupancy, and weather data. Duties will also include reviewing utility invoices for abnormal use patterns, correct charges, correct service types, and work with district staff and utility companies to coordinate billing adjustments. Conjointly, the RCM will track district savings resulting from billing errors, rate changes, reductions in utility usage due to building modifications and conservation practices, and create and deliver the necessary training to district staff to reduce utility cost.

This position reports to the Assistant Superintendent of Business and Operations and interacts daily with district administrators, building operators, maintenance personnel, principals, building staff, and students.

ESSENTIAL JOB FUNCTIONS:

1. Develops and implements resource conservation programs for all district-owned sites.
2. Monitors and reports resource use at each facility; reviews and tracks utility invoices; monitors utility rates; assists in developing and monitoring utility budgets.
3. Maintains accounting and utility use database utilizing software compatible with local utility companies/agencies.
4. Promotes strong resource conservation and recycling programs and practices among employees, students, and the school communities.
5. Works in close communication and coordination with Puget Sound Energy and other utility RCM engineers and managers from the City of Bellingham, Western Washington University, St. Joseph Hospital, etc.
6. Provides appropriate technical support, assistance, and training to school staff, communities, custodial and maintenance staff, capital projects and planning staff, and administrators.

Energy Use Expectations

The following guidelines are set forth to establish standards to optimize the learning and working environment conditions and to avoid unnecessary utility expenditures. The district utilities budget is in excess of 2.7 million dollars. With a minimum program goal of a 3% reduction in utility costs, the savings can be significant and, when redirected to teaching and learning activities, makes a positive contribution to the district's primary mission.

The district's Maintenance and Operations Department is committed to continually improving the efficiency of all systems. All district staff, students, and patrons are expected to follow these guidelines:

Lighting

1. Classroom, Shop, etc.: Lights should be off when area is unoccupied for 5 minutes or longer.
2. Gymnasium, Multi-purpose Room, Cafeteria: Lights should be off unless the area is being utilized.
3. Hallway and "Commons": Lights should be turned off at the end of the instructional day when not needed. Emergency egress lighting should be turned off when the building is not occupied, unless this causes battery back-ups to come on.
4. Outside: Lighting will be used only when the building is occupied and only during hours of darkness. Time clocks should be reset every 2 weeks.
5. Night custodians should light only the specific area in which they are working

Heating

Heating systems should always be operated in the most economical and efficient way possible and operate for the minimum amount of time required to provide the approved climate for a specific area and activity.

1. **Regular School Days:** The heating system should be set to provide the following temperatures during student occupancy:

Classrooms and Libraries	68
Gyms and Multi-purpose Rooms	65
Offices	68
School Shops	68
Hallways	65
Kitchens	65
M&O and Transportation Shops	65

The night setback heating temperature at all facilities is 55 degrees.

- Close window coverings at the end of the work day.
- Close doors and windows.

Space heaters may only be used with the consent of a Resource Conservation Manager

2. **Student Vacation Days/Staff Workdays/Weekends/Holidays/Non-Student Occupancy/Winter/Spring/Summer Vacations:**

The entire building will operate at the night setback of 55 degrees.

Additional written instructions are given to Custodians prior to these vacations.

Air Conditioning

Cooling systems are only provided in limited areas. Cooling systems should always be operated in the most economical and efficient way possible and operate for the minimum amount of time required to provide the approved climate for a specific area and activity.

1. **Regular School Days:** The cooling system should be set to provide the following temperatures during student occupancy:

Classrooms and Libraries	73
Gyms, Multi-purpose Rooms	76
Offices	73
School Shops	76
Hallways	76
Kitchens	76
M&O and Transportation Shops	76

The night setback cooling temperature at all facilities is 85 degrees.

- Close window coverings during the day to keep the heat out.
- Close doors and windows.

Fans may only be used with the consent of a Resource Conservation Manager.

2. **Student Vacation Days/Staff Workdays/Weekends/Holidays/Non-Student Occupancy/Winter/Spring/Summer Vacations:**

The entire building will operate at the night setback of 85 degrees.

Additional written instructions are given to Custodians prior to these vacations.

Electrical Use

1. All electrical equipment such as computers, copy machines, lamps, coffee pots, radios, etc., must be turned off at the end of the individual's work-day. All refrigerators and freezers in schools must be cleaned out and turned off during the summer break. Food Services will control the shutdown of all kitchen refrigeration. Vending machines, exhaust fans, appropriate circulating pumps, and other electrical equipment will be turned off during vacation times.
2. Kilns, self-cleaning ovens, and any other high-energy use items should only be activated between 2:00 p.m. and 5:00 a.m. in order to avoid high electrical demand charges.

Water

1. Domestic water temperatures will not exceed 110 degrees. For individual cafeterias with electric dishwashers, Food Services will determine the water temperature (normally 160 degrees when a chemical rinse is not available).
2. Water conservation by students and staff should be practiced at every opportunity.
3. Irrigation of lawns and athletic fields is to be completed prior to 6:00 a.m. Irrigation for lawns and fields is to be used only when needed and is not to exceed one inch per week during June, July, and August. Landscape vegetation needs only one-half inch per week. Landscape vegetation native to the northwest need not be irrigated at all. Irrigation will be turned off when rainfall nears one-half inch per week. May and September variations to this schedule will be implemented by the Buildings and Grounds Manager.

Solid Waste and Recycling

1. Each school is expected to make recycling a priority in order to reduce solid waste.
2. The custodial staff will monitor the quantity in the dumpster. Dumpster size and frequency of pick-up will be monitored by the RCM and adjusted accordingly.
3. Regularly scheduled garbage service will be discontinued and on call only during student vacations of a week or longer.
4. All students and staff are encouraged to follow the "3 Rs" - Reduce, Reuse, Recycle.
5. District will continue to support and implement the Food to Flowers Program, which has successfully recycled over 1 million pounds of waste.

Building Occupant Instructions

- Avoid using incandescent lights when possible. Energy is conserved instantly when the bulb is turned off. For fluorescent lighting, it is recommended to turn the lights off when the area will not be used for at least 5 minutes.
- Turn off all lights at night, including task and office lights.
- Appropriate winter dress - sweaters and slacks. If extra heat is needed, obtain consent from the RCM for the use of a radiant electric heater.
- Turn heater off when away from the desk.
- Turn off computer monitors or use the low power standby when not in use. This will save \$40 per year per 19" monitor.
- Turn off the computer as well as the monitor at the end of the day.
- Move as far away from windows as possible if you feel cold. Windows draw heat from people in winter making them feel colder.
- Close blinds when not using a facility to cut down on heat loss. Open blinds for light and warmth on sunny days. In warm weather, close blinds to aid cooling.
- Ensure pop and snack vending machines are equipped with a "vending miser." This will save between \$50 and \$110 per year.
- Make sure the office copiers are put in sleep mode at night. Large machines can use hundreds of dollars worth of energy keeping the copier heater ready for use.
- Use only one energy efficient refrigerator in a common break room area.
- Eliminate all personal and residential appliances such as hot plates, coffeepots, refrigerators, microwaves, etc., from individual workspaces or offices.
- Turn off all tools, office machines, and portable appliances when not in use.

Facility Action Plan

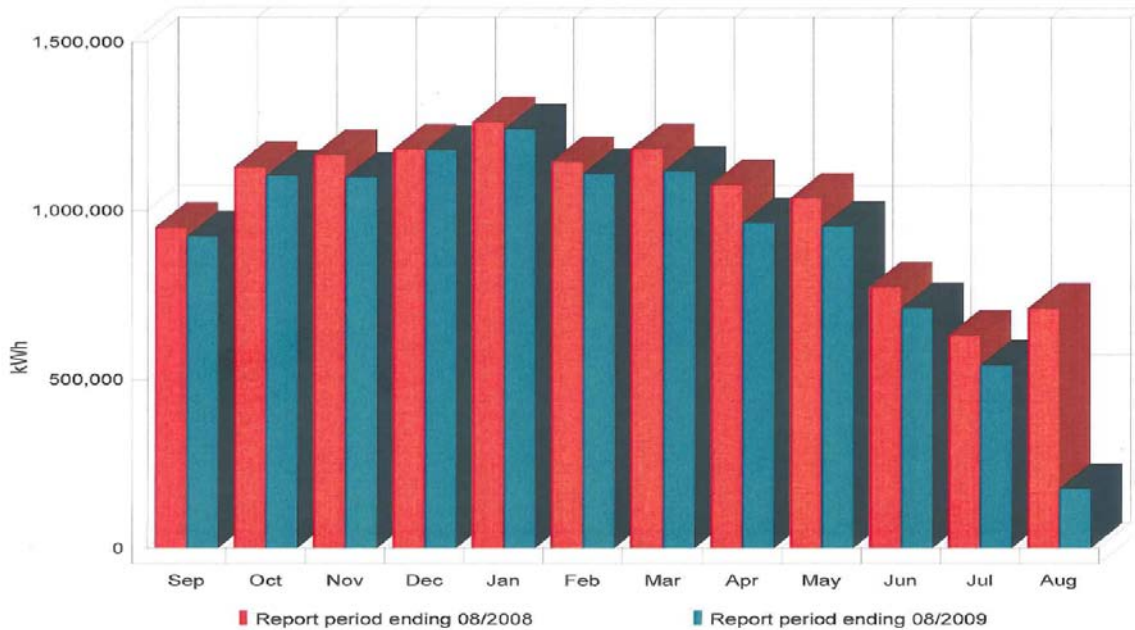
In addition to the Energy Use Expectations outlined in the document, the district also completed the following operational system modifications:

- **Replaced older unitvents with more efficient units with programmable controls:** Alderwood ES, Happy Valley ES, Silver Beach ES, Parkview ES, Birchwood ES, and Sunnyland ES (completed summer 2008 & 2009).
- **Installed new Lon-based HVAC Digital Control Systems:** Silver Beach ES (completed December 2008), Fairhaven MS (completed April 2009), Whatcom MS, Sunnyland ES, Birchwood ES (completion scheduled for August 2009).
- **Replaced steam traps:** Birchwood ES, Columbia ES and Carl Cozier ES (all completed in April 2009). Lowell ES, Larrabee ES, Roeder Admin. Building and Sunnyland ES (completion scheduled for August 2009).
- **Tuned boilers:** Birchwood ES, Columbia ES, Carl Cozier ES, Whatcom MS, Sehome HS (completed April 2009). Squalicum HS, Roeder Admin. Building, Alderwood ES, and Larrabee ES (completion scheduled for August 2009). All remaining district boilers to be completed by district staff with recently purchased Testo 327-4, boiler tuning and test equipment during the summer of 2009.
- **Installed sheaves in fan motors to reduce speed and electrical draw:** Silver Beach ES, Kulshan MS, and Northern Heights ES and reprogrammed start/stop sequences (completed March/April of 2009).
- **Installed digital control and timers on Transportation Department block heaters:** (scheduled completion August 2009). Program the controllers to limit heat and timers to sequence time on, thereby reducing electrical draw.
- **Programmed digital HVAC systems to phase in start/stop times to reduce demand charges and reduce run times:** Bellingham HS (completed April 2008), Northern Heights ES (completed May 2009), Silver Beach ES (completed March 2009), Fairhaven MS (completed April 2009).
- **Replaced existing exit signs with low energy LCD signs:** 75 completed by our district electrical staff by August 2009, with the remaining 50 by August 2010.

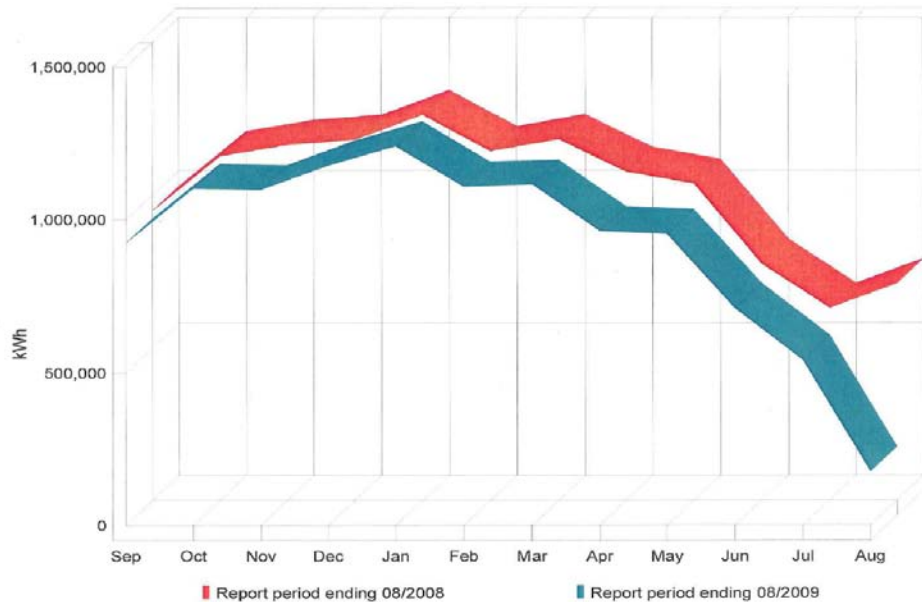
Electricity Usage Reductions in 2008/09

The graphs below compare the district's 2008/09 monthly electricity usage to the previous school year. Although PSE increased electricity rates by 10% in 2008/09, the RCM Program was able to reduce the district's electricity usage by 1,129,371 kWh, thus saving approx. \$99,384.65.

Monthly Electricity Use for Bellingham School District



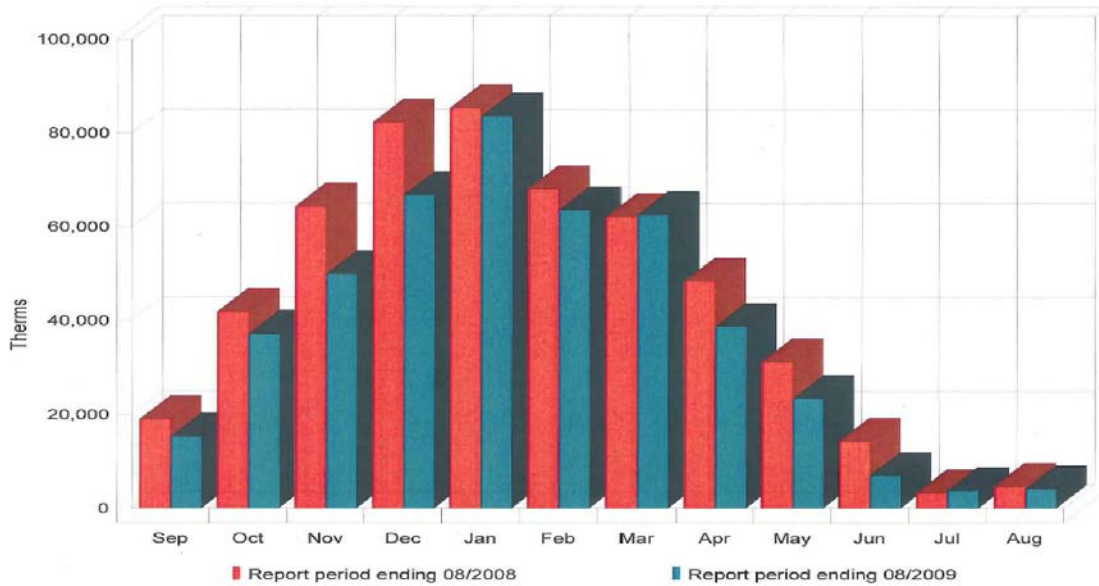
Monthly Electricity Use for Bellingham School District



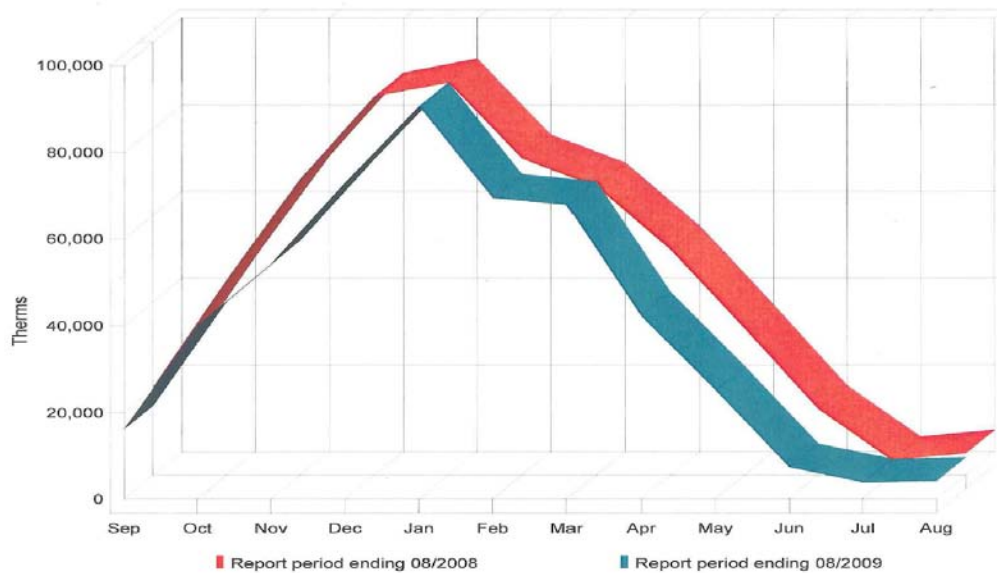
Natural Gas Usage Reductions in 2008/09

The graphs below compare the district's 2008/09 monthly natural gas usage to the previous school year. Although Cascade Natural Gas increased natural gas rates by 25%, the RCM Program was able to reduce district usage by 69,292 Therms, thus saving approx. \$74,835.36.

Monthly Natural Gas Use for Bellingham School District



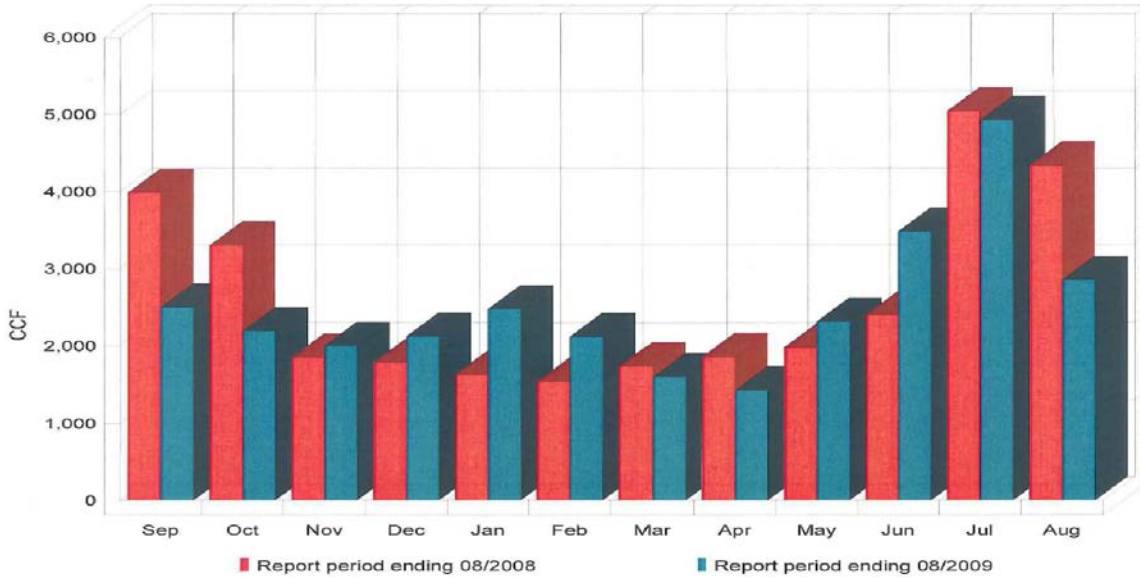
Monthly Natural Gas Use for Bellingham School District



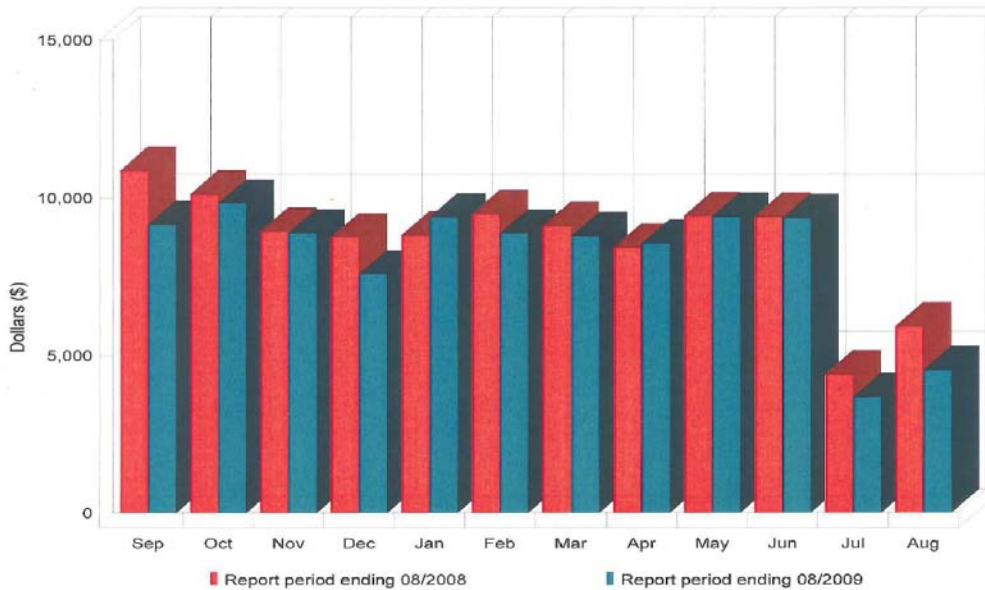
Water and Refuse Usage Reductions in 2008/09

The graphs below compare the district's 2008/09 monthly water and refuse usage to the previous school year. Overall, the RCM Program has been successful in reducing water and refuse usage for an estimated savings of \$5,500.

Monthly Water Use for Bellingham School District



Monthly Refuse Cost for Bellingham School District



Electricity and Natural Gas Use Comparison by Building

2007/08 vs. 2008/09

The chart below compares the district's 2008/09 electricity and natural gas usage by building to the previous year. Excluding Shuksan (because it was opened in Sept. 2009), twenty-one of the district's 25 buildings made positive progress in reducing overall energy usage. The buildings that experienced an increase in energy usage will be reviewed in detail by the Resource Conservation Managers in 2009/10. The total savings for electricity and natural gas district wide is \$174,220.01.

Electricity and Natural Gas Usage Comparison by Building

	2007 - 2008 Usage			2008 - 2009 Usage			Mbtu Usage (Reduced) or increased
	Electricity kWh	Natural Gas Therms	Total Energy Mbtu	Electricity kWh	Natural Gas Therms	Total Energy Mbtu	
Squalicum	1,936,501	80,020	14,609	1,808,856	83,080	14,480	(129)
Bellingham	2,088,493	21,445	9,270	1,848,455	15,903	7,897	(1373)
Sehome	1,217,690	73,906	11,545	1,040,971	67,031	10,255	(1290)
Kulshan	692,346	47,494	7,112	606,329	36,953	5,764	(1348)
Fairhaven	634,119	22,235	4,387	540,972	20,641	3,910	(477)
Whatcom	455,509	58,695	7,424	433,757	51,636	6,644	(780)
Shuksan - N/A new building	0	0	0	0	0	0	0
Geneva	1,056,677	0	3,605	1,036,793	0	3,538	(67)
Northern Heights	300,961	28,344	3,861	301,432	20,978	3,126	(735)
Silver Beach	434,145	30,943	4,576	371,453	20,224	3,290	(1286)
Carl Cozier	251,814	27,010	3,560	218,876	25,786	3,325	(235)
Roeder	489,402	14,693	3,139	460,812	11,924	2,765	(374)
Parkview	255,225	13,243	2,195	203,096	11,680	1,861	(334)
Birchwood	244,607	28,531	3,688	227,106	22,096	2,984	(704)
Roosevelt	599,283	0	2,045	578,710	0	1,975	(70)
Alderwood	190,163	13,679	2,017	178,157	14,308	2,039	22
Happy Valley	339,037	9,589	2,116	286,544	9,323	1,910	(206)
Sunnyland	207,350	16,641	2,372	177,655	11,414	1,748	(624)
Columbia	142,854	16,803	2,168	113,941	12,335	1,622	(546)
Transportation	239,531	3,670	1,184	233,822	2,853	1,083	(101)
Maintenance	82,452	6,716	953	74,372	6,045	858	(95)
Larrabee	104,593	4,460	803	100,994	4,987	843	40
Options	98,873	0	337	100,094	0	342	5
Warehouse	62,993	6,894	904	59,328	6,522	855	(49)
Early Childhood Center	121,425	0	414	114,147	0	389	(25)
TOTALS	12,246,043	525,011	94,284	11,116,672	455,719	83,503	(10,781)

* 1 kWh = \$0.08.8

** 1 Therm = \$1.08

	07/08 Usage	08/09 Usage	Amt. Reduced	kWh & Therm	Amount Saved
*Elec. Savings	12,246,043	11,116,672	1,129,371	\$0.088	\$99,384.65
**N. Gas Savings	525,011	455,719	69,292	\$1.08	\$74,835.36
Total Saved on Electricity and Natural Gas Only					174,220.01

Future Plans and Conclusion

Future Plans

While success to date has been noted, our work is not complete. Major future activities include:

- Continue tuning work on all district boilers.
- Change from a 96 watt 3-bulb fixture to a 56 watt 2-bulb fixture – districtwide.
- Continue installing and updating control systems in all buildings.
- Install devices to reduce water flow in urinals.
- Replace unitvents at Columbia (new wing).
- Continue training and educating staff – change occupant behavior.
- Enforce the district's Energy Use Expectations.

Conclusion

Overall, the Resource Conservation Program has been successful as evidenced by the data on pages 10 - 13. Encouraging occupant behavior changes, combined with operational system modifications, has yielded significant positive results in terms of reducing energy usage and cost. When combining the savings/cost avoidance from electricity, natural gas, water, and refuse, the District has saved an estimated \$179,720.01. These savings can now be used to further the district's mission of College, Career, & Citizenship for all students.