

Multnomah Education Service District

Facility Services Department

Report On Utility Conservation Efforts

Report to the Board

3-20-12

Mark Wheeler and Eva Monlux

Report on Utility Conservation Efforts

This report is to summarize some of the utility conservation projects the Facility Services department has recommended, designed, and executed over the last several years, and to report the successes of those efforts. As the team responsible for managing operations of all MESD facilities, we are very aware of the potential for energy savings through utilizing improved management of resources and incorporating new and more efficient technology where applicable.

It is the goal of the Facility Services team to operate the buildings of the MESD in a way that utilizes resources as efficiently as possible. In an effort to do this, periodically we have asked for capital improvement dollars to fund projects. In this report we will discuss several of those projects as well as the results we have seen. I am proud of the results we have been able to achieve, as we have been able to save the MESD hundreds of man hours, and tens of thousands of dollars per year. We are pleased to be able to make this contribution to the effective and efficient operation of the agency.

It is important to note that while the Capital projects we will discuss represent a significant expenditure of agency dollars, in more than one instance we have been able to secure other funding to help mitigate those expenses. We have made ourselves aware of those other funding sources, the requirements for obtaining those funds, and aggressively pursued those options where possible.

The utility conservation projects have focused on the buildings owned by the MESD: Ainsworth, Alpha High School, and Arata Creek School. The projects will be discussed as follows:

Ainsworth

- Sub Meter Program
- Lighting Retro Fit
- HVAC Control Upgrades
- Energy Study

Alpha High School

- HVAC Control Upgrades

Arata Creek School

- HVAC Control Upgrades

Ainsworth – Sub Meter Program

Since 2002 the MESD has taken advantage of the City of Portland Water Bureau's sub meter program. This program allows the MESD to self monitor and report the use of irrigation water in order to save sewer charges to the agency.

At our Ainsworth facility, the way our water billing works is that we are billed water and sewer charges based on the amount of water we use (much like you would in your home). With the sub meter in place, we self report to the Portland Water Bureau the amount of water we have used for irrigation, and for that portion of our usage we are not billed for sewer charges. Since it costs approximately twice as much to get rid of water (sewer charges) as it does to bring in water, this has resulted in significant savings.

In the last 9 years since the sub meter was installed, we have averaged \$9,425 per year in savings on our water bills, for an estimated total of over \$80,000 since we began this program. With the initial cost of this meter being approximately \$3,500, we have seen this project pay off quite handsomely.

Ainsworth – Lighting Retro Fit

In the summer of 2008 the MESD undertook a project to upgrade all lighting systems at the Ainsworth location. In the course of this project, almost every lighting fixture (over 800 fixtures) in the Ainsworth building was either replaced or upgraded to a more efficient light source. In addition, a majority of the building was equipped with occupancy sensors to avoid lighting unoccupied areas. These sensors detect people activity, and if none is detected after a certain period of time (normally 5-10 minutes) the lights are turned off.

The benefits of this project have been evident, as this project combined with our other efforts has shown significant reductions in electrical consumption. The lighting project cost \$145,000, but with the rebates from Energy Trust of Oregon, and Bureau of Energy Tax Credits (BETC) totaling \$ 71,000, the expense to the agency was \$74,000. We do know that the energy projections for this project indicated a 5.1 year ROI, and over the course of the last several years, our data indicates this projection was accurate.

The upgraded system has provided other cost savings besides the energy costs themselves; time spent replacing lights for the last several years has been almost nonexistent. In the past we had spent an average of at least one hour a week replacing burnt out light bulbs. Because this project provided the building with all new light bulbs, we have spent very little time in the last several years replacing lights. That means we can estimate having saved well over one hundred fifty man hours in replacing light bulbs since the installation of our new lighting system, resulting in a saving of close to \$4,000. We anticipate this benefit will continue to a certain degree for the next several years as well.

Ainsworth – HVAC Control Upgrades

In 2009 MESD implemented control system components upgrade that allowed simplified scheduling of system operation, and also provided limited remote monitoring of system operation. By this change of HVAC operations we are able to quickly adjust operating schedules to accommodate building loads. The new system has allowed much easier scheduling of “down” times for HVAC system operation and has allowed the Facility Services team to take advantage of holidays and break periods when the building will be unoccupied. The initial investment for this was \$ 5,000, and as evidenced by the attached graphs, has paid for itself many times over.

Ainsworth-Energy Study

In 2011, we initiated and conducted an “Energy Study” to identify additional areas of potential energy savings. Originally slated to be a “Retro Commissioning Study”, we were encouraged to change this to an “Energy Study” by the engineering firm conducting the study, based on our knowledge and documentation of building operating systems, as well as our preventative maintenance programs.

With the help of Energy Trust of Oregon we were able to conduct this study at our Ainsworth facility to identify areas of potential energy savings. This study, with an estimated value of \$12,000, was conducted at no cost to the MESD, but has provided us with a valuable resource for identifying what projects we should focus on next. The projects recommended are things such as new energy efficient water heaters, variable frequency drives for air handlers and water circulating pumps, and upgrading pneumatic controls to current Direct Digital Control (DDC) technology.

Thanks to this study, we now have a list of projects that can act as a guide for continued improvement in building operating systems and energy efficiency.

Alpha High School- HVAC Control Upgrades and Arata Creek School – HVAC Control Upgrades

In 2009 MESD implemented a HVAC control system upgrade at the Arata Creek School that allowed simplified scheduling of system operation, and also provided remote monitoring of system operation. The following year in 2010 we did a somewhat similar project at Alpha HS, with the exception being the replacement of many of the control components that had been incompatible within the previous system.

These new systems have allowed much easier scheduling of “down” times for HVAC system operation and have allowed the Facility Services team to easily take advantage of holidays and break periods when buildings will be unoccupied. The ability to monitor HVAC system operation remotely also has proven to be a real asset in trouble shooting system operation by allowing us to remotely diagnose reported problems.

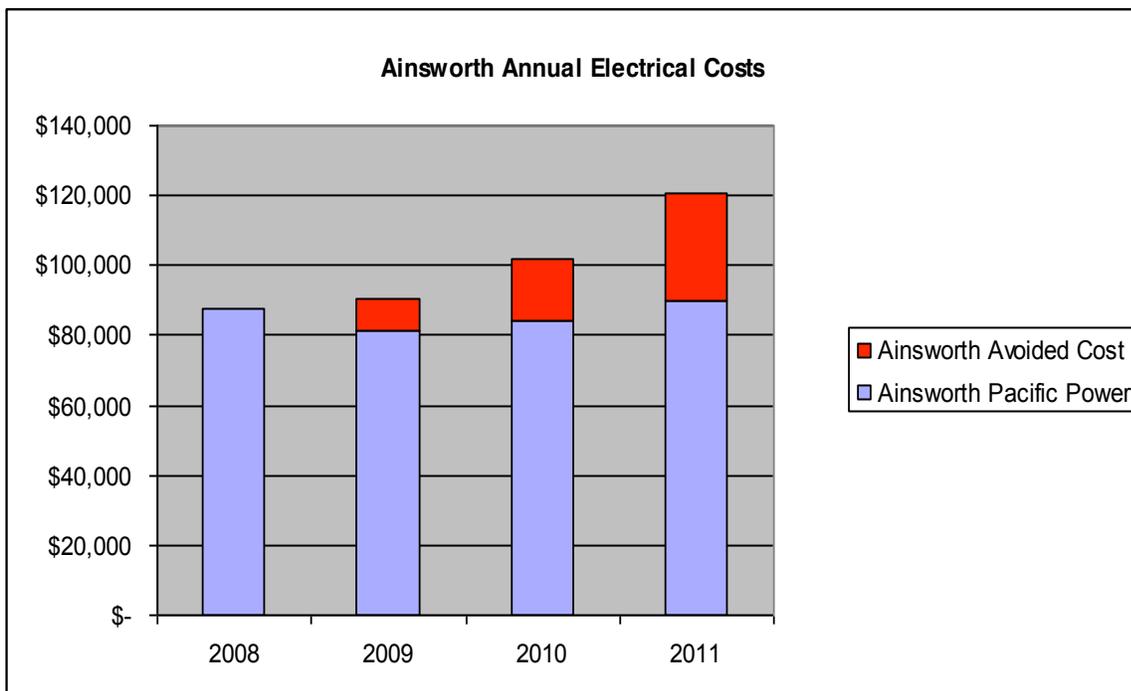
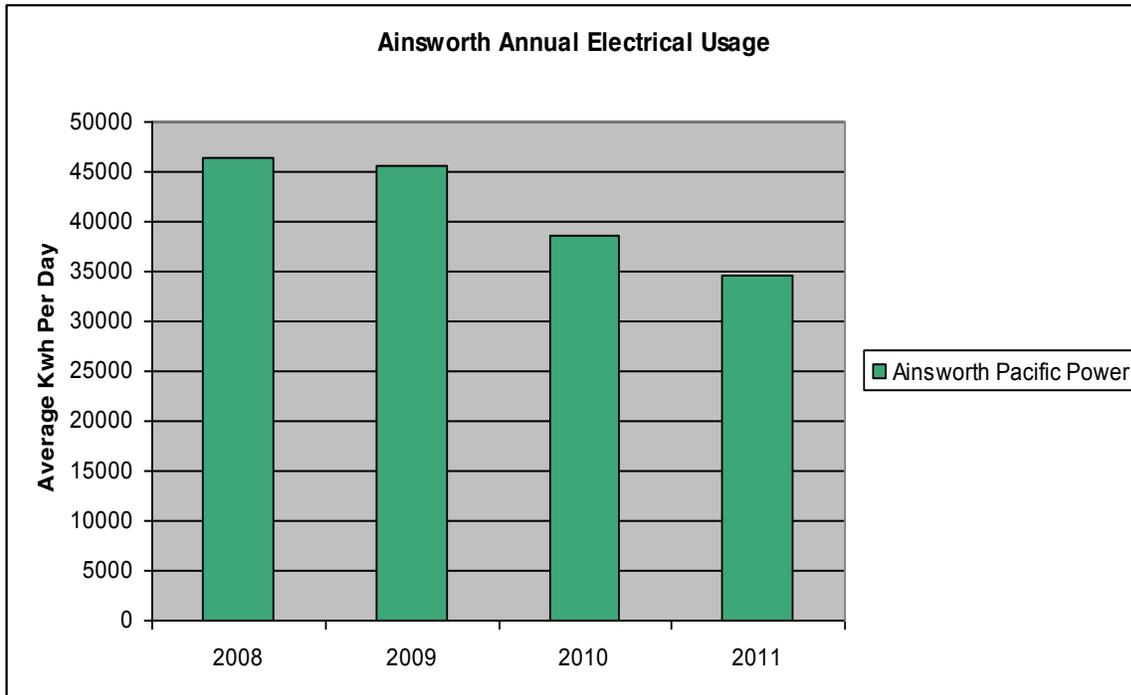
The Alpha project was the much more expensive of the two schools, costing \$40,000, however we were also able to achieve assistance from Energy Trust of Oregon on this project for \$6,000, reducing our out of pocket expenses to \$34,000. Even with the significant expense of this system, we have seen savings that would indicate a simple payback of less than three years. We will reach our “break even” point with this project sometime in the middle of 2012.

The Arata Creek School was much less involved and less expensive as well. The implementation of control upgrades cost about \$3,000, as it was more of a matter of changing hardware and software components to allow it to integrate with our other systems. Our \$3,000 investment on this project has already resulted in roughly \$16,000 in savings.

The resulting savings in both Electric and Natural Gas bills that we have seen since implementation of these energy conservation measures has been nothing short of dramatic. The following graphs illustrate our utility usage over the last four years and show how we have been able to reduce our utility costs by implementation of these measures.

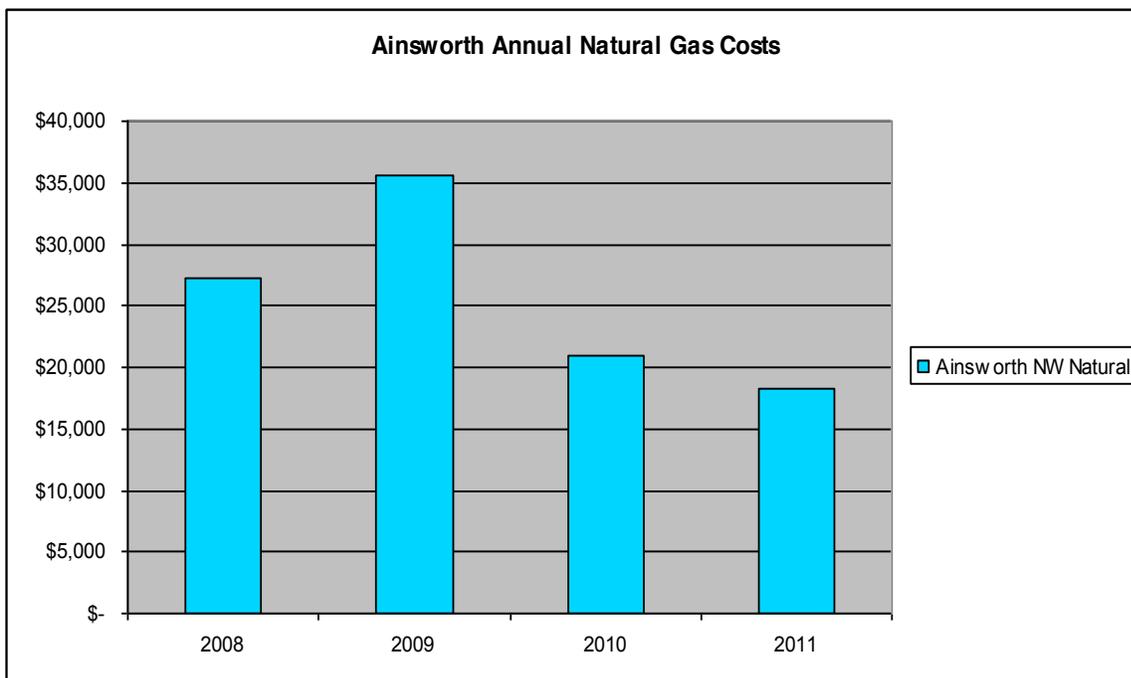
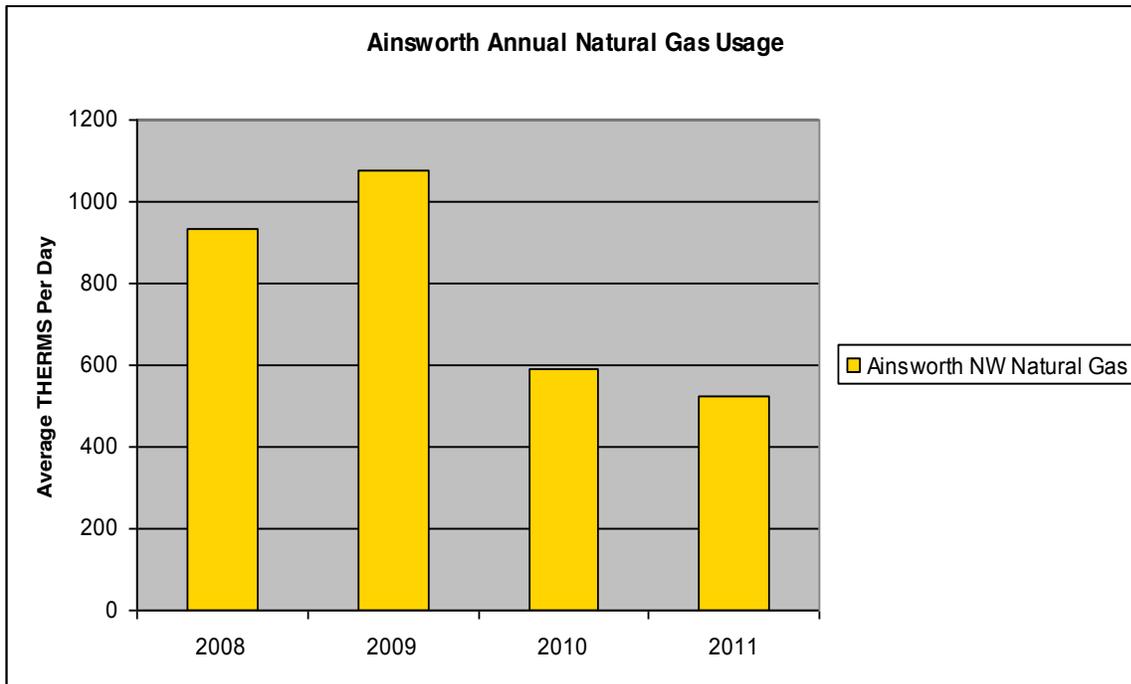
Multnomah ESD
11611 NE Ainsworth Circle
Portland OR 97220

Building Sq. footage: 60,000



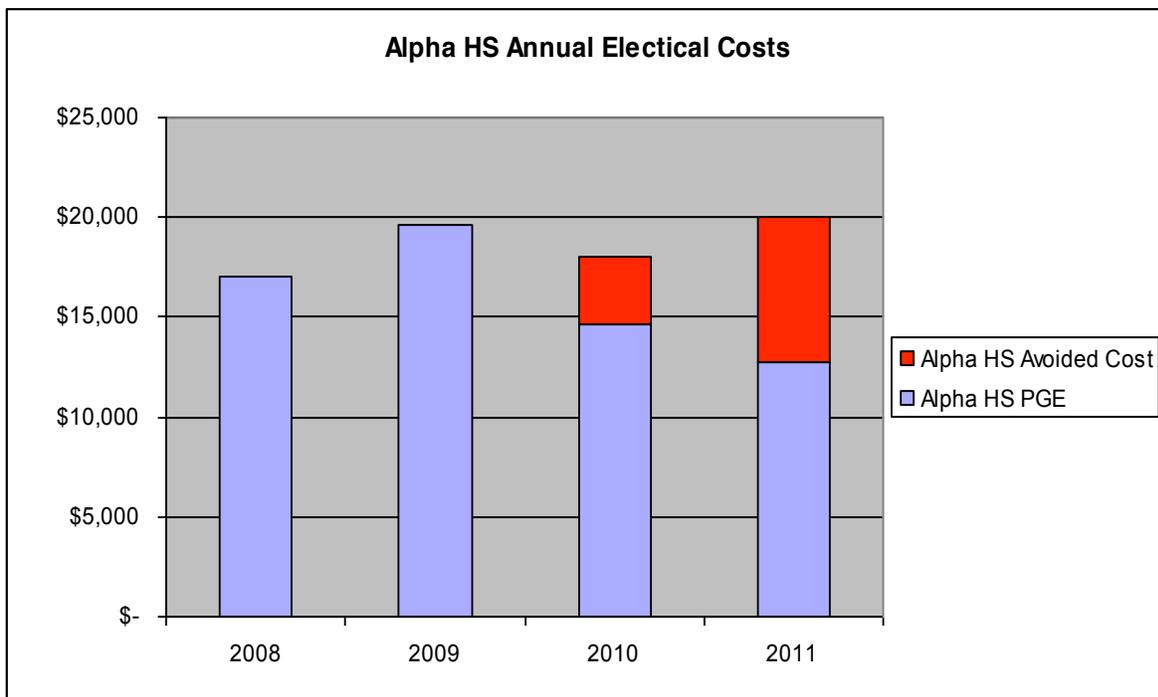
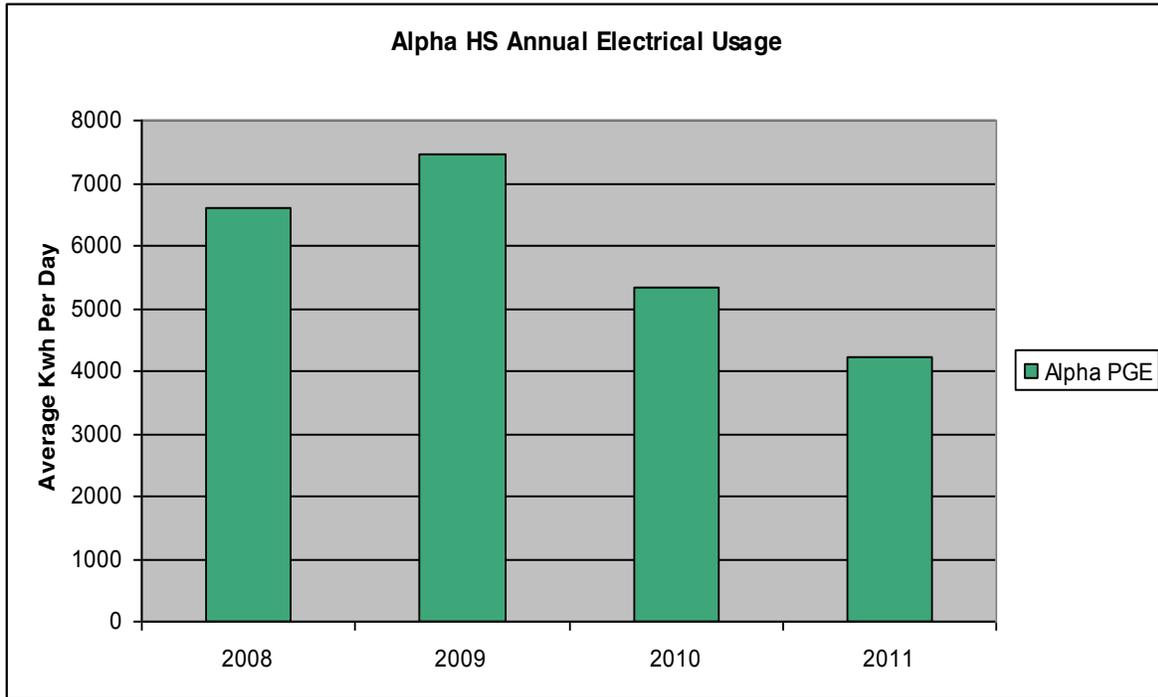
Multnomah ESD
11611 NE Ainsworth Circle
Portland OR 97220

Building Sq. footage: 60,000



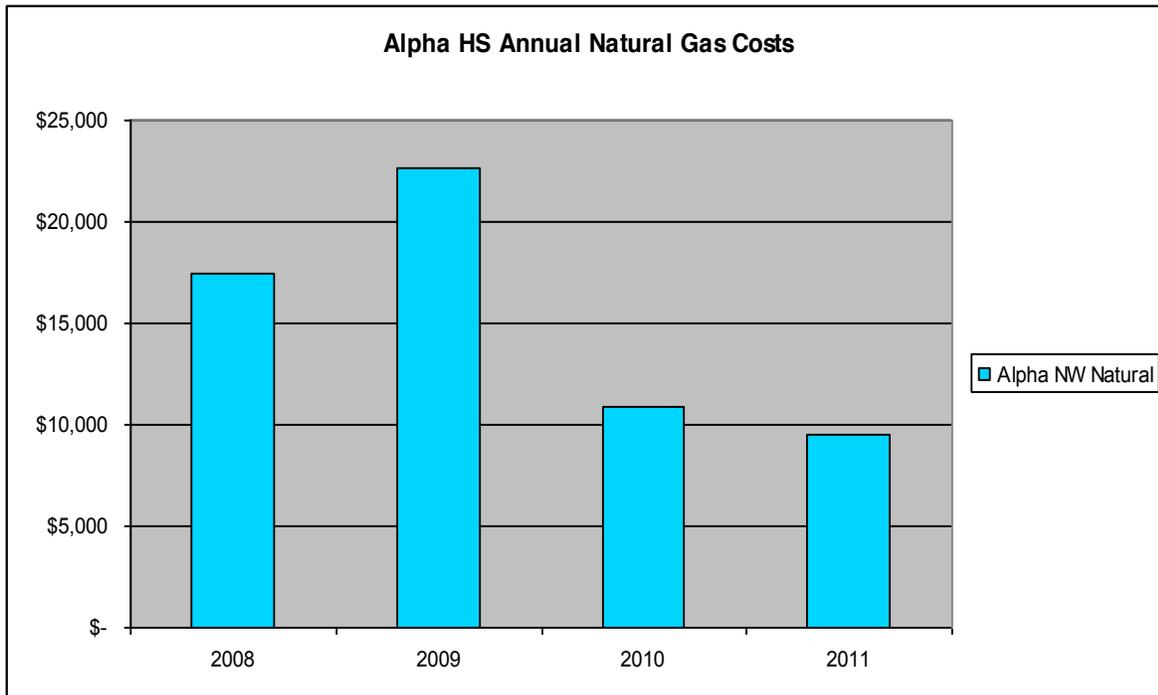
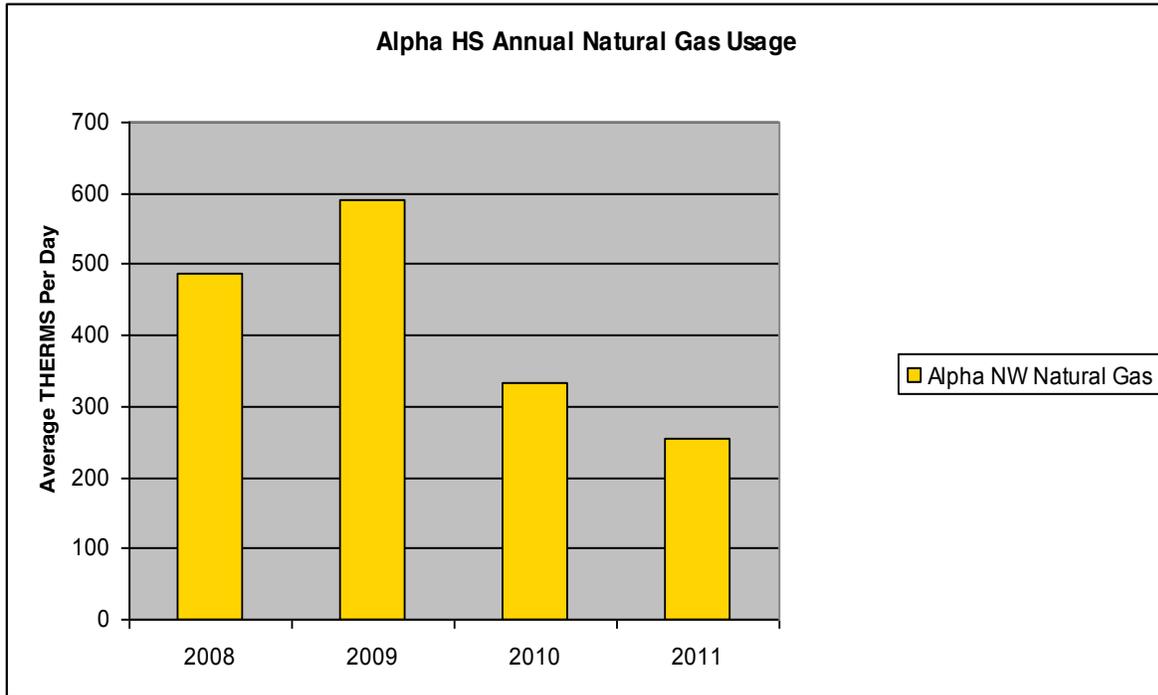
Alpha High School
876 NE 8th Street
Gresham OR 97030

Building Sq. Footage: 17,700



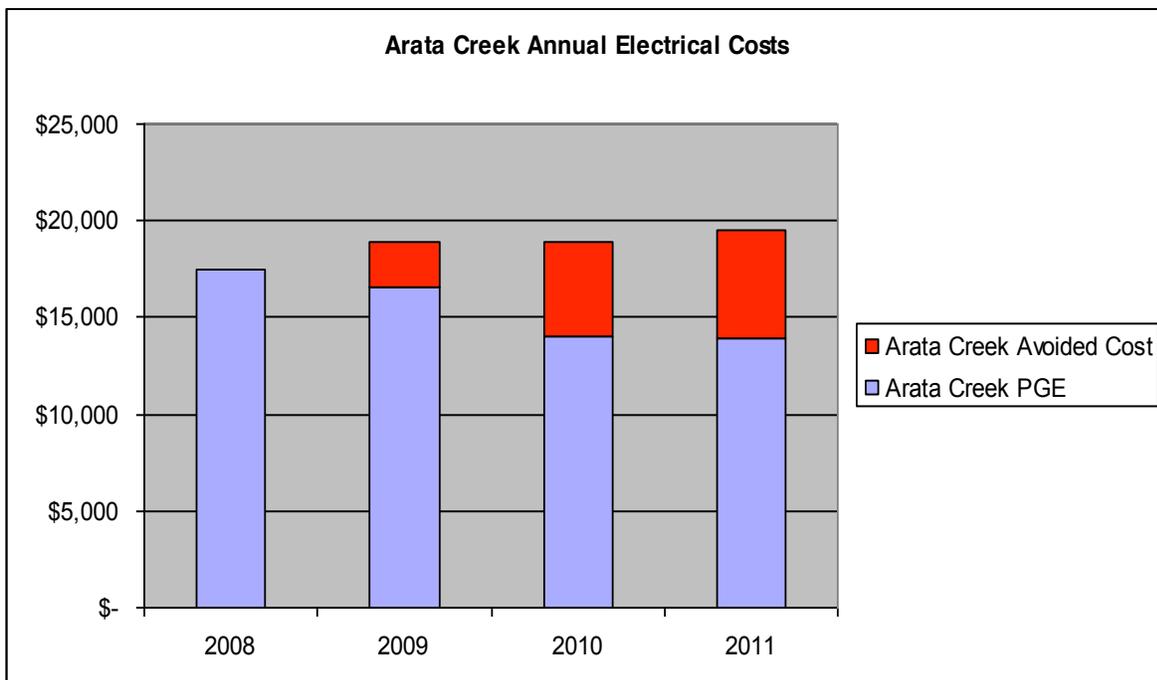
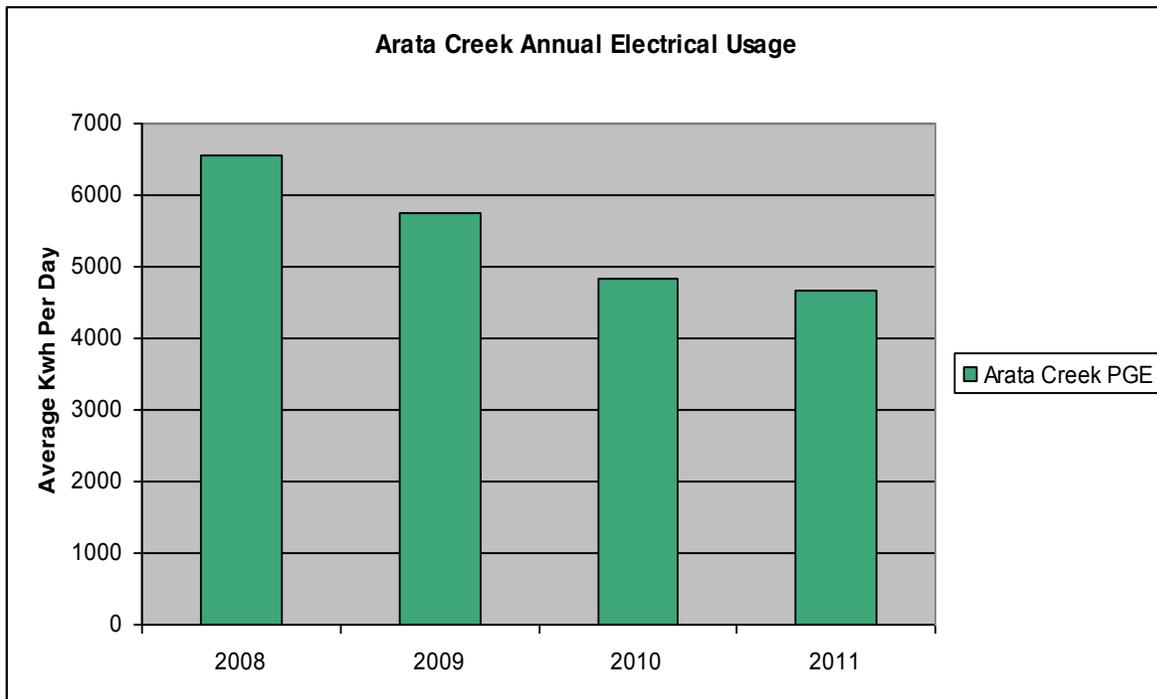
Alpha High School
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Building Sq. Footage: 17,700



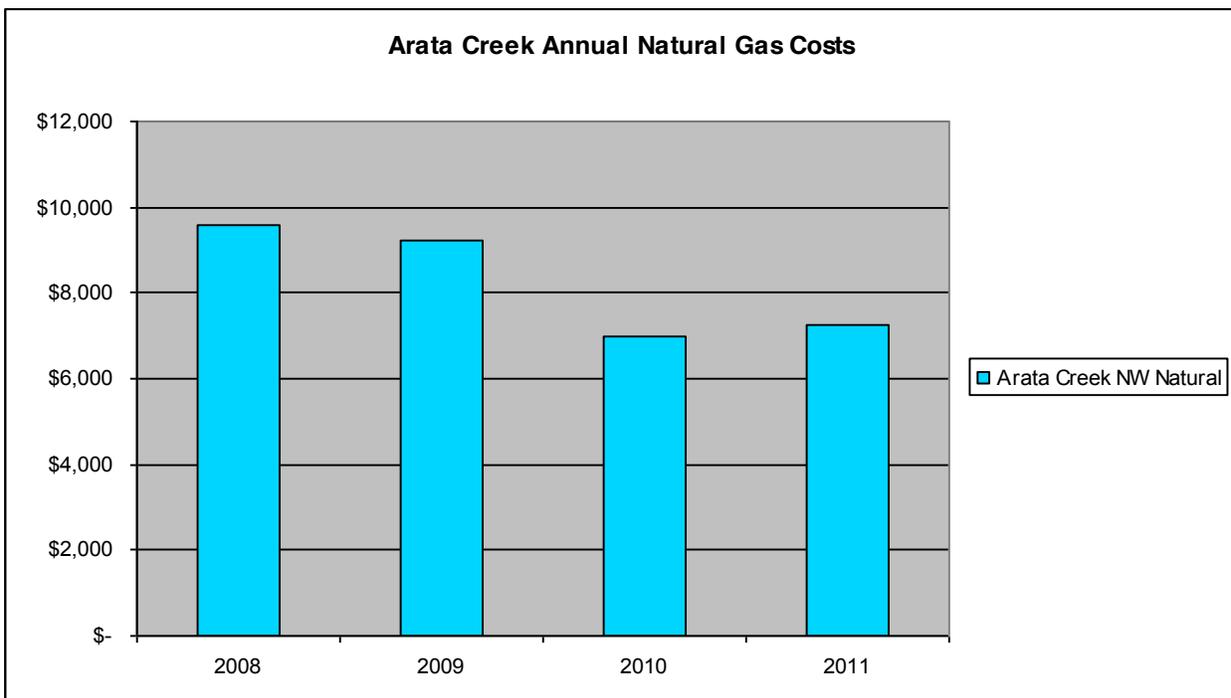
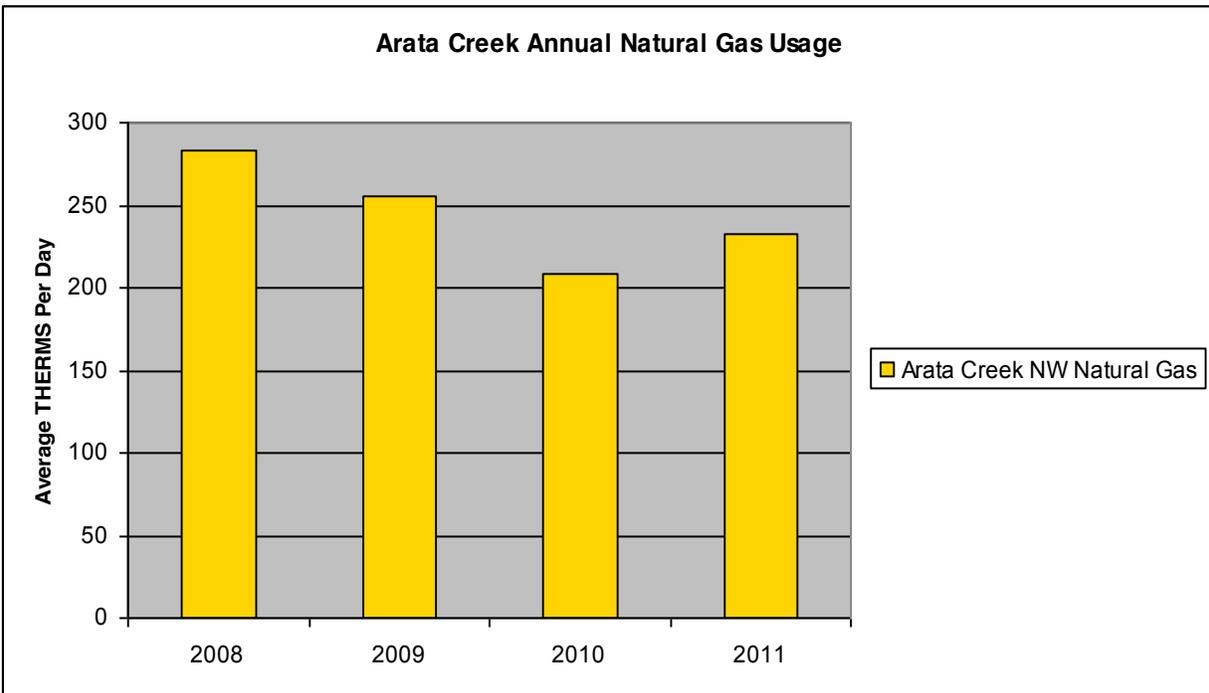
Arata Creek School
2470 SW Halsey Street
Troutdale OR 97060

Building Sq. Footage: 14,000



Arata Creek School
2470 SW Halsey Street
Troutdale OR 97060

Building Sq. Footage: 14,000



We are grateful this agency has placed a priority in investing in its assets, as well as realizing that energy efficiency efforts are a benefit to all of us. We have been very pleased with the result of our efforts, and are hopeful that we will be allowed to continue our efforts in these areas.

It is our hope that our Facility Services team will be able to continue to suggest and implement capital projects that will allow the MESD to recognize savings in utility expenses, thus allowing us to continue to focus our dollars where they should be, on the children and families we serve.