Oregon Stimulus Funds at Work in:

Klamath County

Entity .....Henley High
Project Type:.....Geothermal
Stimulus Funds: ...$643,000
Savings/yr: $85,000

Southern Oregon high school cuts heating costs in half!

Located in Southern Oregon on the outskirts of Klamath Falls, Henley High School is a fairly typical Oregon high school. The school opened in 1909. The student population is 670. The current 123,000-square-foot building was constructed in 1968 and was built in three phases.

But, Henley High School has done something that is far from normal for Oregon schools. It reduced its annual energy use by an incredible 72 percent and its annual energy costs by 52 percent in school year 2010-2011.

...the funds saved will pay for a full-time teacher.

The savings are significant—$85,000 for school year 2010-11. They will recur each year the school building is in operation and will increase as energy costs rise. Best of all, the funds saved will pay for a full-time teacher.

How did Henley High do it? It did not come easy.

There are two major factors that impact Henley High's energy use:

- The Klamath Basin area experiences a wide range of temperatures from 0°F to 90°F. This makes it more difficult to achieve efficient space heating and occupant comfort in a school building in the Klamath Basin than in the milder climate of the Willamette Valley.
- The Klamath County School District, like all Oregon school districts, operates under a very tight budget with little funding available for capital improvements or energy-efficiency projects.

Despite these factors, the district was able to implement changes that reduced energy usage dramatically. It took time, patience, extensive planning, and an opportunity to access grant funding according to Klamath County School District Business Manager Ken Hadlock.

In 1989 the school district drilled a well at the edge of the Henley High School football field looking for supplemental domestic water. They found water, but not the cold water that they wanted. The water from the well was warm—128°F—heated by the geothermal energy found in the Klamath Basin.

Unfortunately, the geothermal-heated water wasn't warm enough—160°F to 180°F—required for optimum space heating use. The district chose to cool a portion of the well water for domestic use and use the warm water for some space heating at Henley Middle School adjacent to the high school.

Klamath County drilled a new injection well for geothermal heated water that heated Henley High School. The project was paid in part with Recovery Act (stimulus) funds.

OREGON DEPARTMENT OF ENERGY

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In 2004, the district had accumulated enough SB 1149 funds* to be used on an energy efficiency project. They were able to add piping and control improvements that allowed the geothermal heated water to provide the Henley High building with space heating down to about 45°F outside temperature with natural gas back-up when the temperature dropped below that. The district was also able to pipe the geothermal heated water through heat exchangers that went to two new domestic hot water heaters to bring the geothermal water up to proper temperature for use in the kitchen, gym showers, etc.

The school district hired local mechanical engineer Brian Brown, PE, a geothermal consultant to the City of Klamath Falls, Oregon Institute of Technology, and Klamath County, for the project. The project was also paid in part with a Business Energy Tax Credit pass-through payment from the Oregon Department of Energy.

The 2004 project helped cut energy use, but the District had a more extensive upgrade in mind. It took access to additional funding from the Oregon Department of Energy (ODOE) and a push from the Oregon Department of Environmental Quality (DEQ) to move ahead with the upgrades.

Recovery Act Opportunity

In 2009 ODOE announced it had received $42.1 million in Recovery Act (stimulus) funding from the US Department of Energy for its State Energy Program. ODOE announced a competitive solicitation to fund energy efficiency and renewable energy projects.

Hadlock immediately contacted engineer Brown and others, dusted off the upgrade plans and applied for an energy grant. In late 2009, ODOE announced that the Klamath County School District qualified for a $643,000 award for an upgrade to the heating system and building envelope for Henley High.

The District combined this funding with a Business Energy Tax Credit pass-through payment of $170,000, a federally subsidized zero interest loan of $959,000, and a $127,350 grant from Avista, the district's natural gas supplier. The total project cost was approximately $1.9 million.

*SB 1149 provided for Public Purpose Charges to be collected from ratepayers and used in part by school districts in service territories of Pacific Power and Portland General Electric beginning in 2001. Klamath County School District is in Pacific Power territory.

Klamath County School District installed new ducts at Henley High School and added insulation to the exterior walls and ceiling to reduce heat loss to the building constructed in 1968.

Push from DEQ

After the original well was drilled in 1989, the District constructed a cooling pond, operated under an Oregon DEQ discharge permit, to cool the spent geothermal water and return it to a nearby ditch. However, in 2006, the DEQ notified the school district that it must drill a well to inject the spent water back into the aquifer as a condition for continued operation.

The combination of available funding and the DEQ requirement were sufficient to move the project ahead. The goal was to use the geothermal resource to heat the entire building down to 10°F. The challenge was to use the available 128°F geothermal water to supply enough heat. To do that, the district:

- Installed larger heat exchangers to extract more heat from the water.
- Added improved Direct Digital Controls to maintain comfortable conditions and indoor air quality while reducing natural gas use and making more effective use of geothermal heat.
- Added insulation to the exterior walls and ceiling which had minimal insulation to reduce building heat loss.
- Replaced duct work.

Brian Brown was the engineer and Tim Thompson was the project manager. The project began in July 2010 and was completed September 2010.

Other local contractors working on the project included Diversed Contractors, Inc., Winema Electric, Powley Plumbing, Metal Masters, Coleman Creek Consulting, Inc., and Atkins Engineering, ZCS Engineering. All are from Klamath Falls or Medford area.

Many benefits

Today, Klamath County School District is reaping the benefits.

"The feasibility study estimated Henley High would save 70,000 therms a year in natural gas if the energy measures were installed," said Thompson. "The actual amount of therms saved when the measures were complete was even more—80,970."

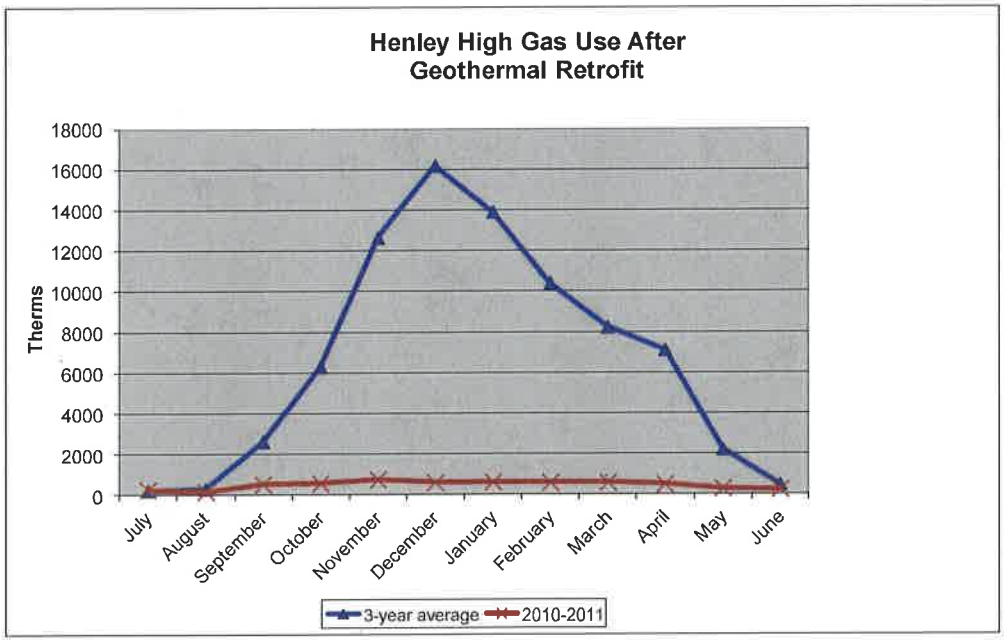
The project was designed to not require any additional natural gas backup for heating until the temperature dropped to 10°F . In December of 2010, the temperature dropped below 0°F, but no gas backup was needed.

In addition to energy savings, the geothermal energy is renewable and offsets natural gas, a fossil fuel and its carbon emissions. The project improves electrical efficiency with the Direct Digital Controls and various variable speed, variable flow air handlers and pumps.

There are other benefits, too. Teachers have much better control of classroom temperatures, the air feels fresher and the learning environment has been improved.

Maintenance costs have been reduced, too. Henley High Head Custodian Dale Miller said "The old heating system was like an old car. It took a lot of elbow grease to keep it working. This new system has been a huge help."

Henley High is no longer your "typical Oregon high school" with high energy use and costs. The Klamath County School District has made it a model for energy efficiency.



The Oregon Department of Energy (ODOE) awarded this energy project with American Recovery and Reinvestment Act (stimulus) funds through the State Energy Program. These funds are designated for energy efficiency and renewable energy projects. The U.S. Department of Energy administers the funds, approves the projects and reviews the state's progress. The Oregon Department of Energy received $42.1 million in SEP funding. All projects must be completed by February 15, 2012.

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