Case Study: Rural Oregon School

Rural school adds efficiency to coal-fired boiler

The majority of Oregonians have probably not been to Harper. Most may not have even heard of the Eastern Oregon town.

Situated on the Malheur River in the far southeastern corner of the state, the unincorporated city is far from the state's population centers. The town itself has just 226 residents, primarily ranchers and farmers.

But, the 88 students who attend K-12 Harper School were not overlooked when the Oregon Department of Energy in Salem and the Harper School's electric utility, Idaho Power, were searching for eligible school energy-efficiency projects.

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>
> ***Karen Steele***
> ***Business Manager***
> ***Harper School District***

The Harper School is one of a handful of small, rural schools still heated with a steam boiler fueled by coal.

"The system works and cost prohibits a replacement system, but it wasn't operating as efficiently as it could," said Energy Analyst Greg Churchill with the Oregon Department of Energy's Schools Team.

The coal-fired boiler ran 24/7 and produced heat even when it wasn't needed. To make it operate more efficiently, Harper School had a programmable thermostat and control valves installed to regulate the boiler so less heat was produced when there was no demand for it.

According to Harper School District Business Manager Karen Steele, the school doesn't know how much less coal is being burned because they can't determine how much coal from last year's delivery is used before another load arrives. She said, however, that the custodian reports that he is shoveling a lot less coal since the thermostat and valves have been added and the rooms are much more comfortable and are not overheating.

"There are no more open windows in the winter because of excessive heat," Steele said. The efficiency project cost $6,800.

Harper School also replaced 500-Watt incandescent gym lights with energy efficient T5 fluorescent lights and electronic ballasts and installed occupancy sensors. The project is expected to save 67 percent of the school's lighting electrical use.

The lighting upgrade proved to be a safety project as well as an energy saving project. According to Steele, the contractor found bare wires when the gym lights were replaced. "We were lucky the school didn't burn because of the old fixtures," she said.

The new gym lights have received many positive comments from the school community and Harper residents.

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Williams Oil Settlement

Harper School District became a candidate for the energy efficiency projects when funds became available in 2005 through the Williams Oil Settlement.

The Oregon Department of Energy administers the $1 million Williams Oil Settlement. The settlement was the result of a coordinated investigation into allegations of price manipulation and antitrust violations in the Western power market during the energy crisis of 2000-01 by the attorneys general of Oregon, California and Washington.

The Oregon Department of Energy identifies and distributes the funds to school facilities with high-energy use. Harper School qualified. The Williams Oil Settlement funds paid for $10,520 of the $14,740 for both energy projects.

Harper School in Eastern Oregon is saving electricity and money with its lighting project.

Other funding

In addition to the Williams Settlement Funds, the Harper School District lighting project also qualified for the Oregon Department of Energy's Business Energy Tax Credit Program. The School District's electric utility was able to assist so Harper School District could benefit from the tax credit program.

Idaho Power partnered with the Harper School District. The utility served as the school district's "pass-through" partner and accepted their tax credit eligibility. Idaho Power paid the Harper School District a lump sum of $2,333 when the project was complete. In exchange, Idaho Power took the 35 percent tax credit of $2,678 that the project qualified for.

Thanks to the Williams Oil Settlement, Idaho Power and the Oregon Department of Energy, Harper School District students and staff have more efficient heating and brighter, more uniform lights that are saving electricity and money.

Save Steam and You'll Save Heat, and Money

Steam generated by a boiler travels through pipes and/or radiators to heat classrooms. As the steam loses heat, it returns to a liquid state, commonly called condensate. Condensate reduces operating efficiency because it slows the heat transfer process. Condensate can also build up in the system and cause costly physical damage.

Steam traps are automatic valves on the classroom radiators that are designed to remove condensate and air quickly from a pipe. Properly working steam traps are essential for the efficient operation of steam heating systems. When steam traps become worn, they fail to close tightly and allow valuable steam to escape. Leaking traps can waste money, even in low-pressure systems typical in older school facilities.

Some schools replace traps on a regular schedule whether it is needed or not. Others will test in place, but this testing method can be time consuming.

Greg Churchill with the Oregon Department of Energy's School Team recommends a steam trap test station approach for school facility maintenance staffs. On a periodic schedule, pick several radiators to service and remove the thermostat portion of the installed traps on these radiators and set them aside. Replace the thermostat with a new one or one previously tested as good. When staff have a few minutes, they can test the collected thermostats in the steam trap testing station. Failed ones can be discarded and those that pass the test can be used in the next scheduled round of testing.

Steam Trap Test Station

1. Place the assembly to be tested on a trap container that has a steam and water valve connection. The container should have a visible drain at the bottom.
2. Open the steam valve. Trap should not pass steam.
3. Open the water valve (to simulate condensate). Trap should cycle open to release the water.