

BIOMASS

CASE STUDIES SERIES

School Woodchip Heating System

Heating Capacity (output): 440 kW (1.5 MMBtu/hr)

Annual Woodchip Use: 350-450 tons

Emissions Reduction and Combustion Control Equipment: O₂ sensor control

Year Installed: 2005

Thermal Output: Hot water



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COUNCIL, IDAHO SCHOOLS

Building Support and Partnerships for a Local Project

In the autumn of 2004, the superintendent and school board in Council, Idaho, population 900, circulated a brochure.

Infrastructure Revitalization Project, it declared. *Imagination & Innovations ... PLEASE VOTE.*

The community's school system was in a bind. Its high school's electric heating system cost around \$10,000 per month in winter. Its elementary school had a half-century-old diesel boiler that was burning 8,000 gallons a year and costing \$500 a month in maintenance just to keep it going.

For a system with just 240 students, in a community still struggling to rebound from the 1995 closing of its Boise Cascade lumber mill, these costs were crippling the budget. In response, school leaders were floating a \$2.2 million bond issue that would, if approved, provide the main funding for a new biomass heating system that would run on "slash"—woodchips from downed trees and forest debris.

"We're the OPEC of woody biomass, with a thousand years worth of fuel," Superintendent Murray Dagleish boldly declared. Sixty percent of Council's home county lies in the Payette National Forest; the biomass system could use wood that was culled from the forest.

The bond-funded project would also include efficiency work at the school to install power-thrifty lighting, water-conservation measures, and better system controls. "Our proposed improvements will save us energy costs of close to \$1 million over the next several years," the brochure declared. In bold type, it added: "These savings are guaranteed through our performance contractor."

The key was to convince local voters. The brochure told them the project had received \$510,000 in grants; the largest was from Fuels For Schools, a US Forest Service (USFS) program that promotes the use of biomass at schools in Idaho, Montana, Nevada, North Dakota, and Utah.



The case was strong. But the superintendent wasn't just going to rely on a brochure.

"I went to the Lions Club," Dagleish recalls. "I went to the coffee shop ... I pulled up a chair and I said, 'Can I answer any questions about the bond we're trying to pass?'"

The system would need such a small amount of woodchips that "we shouldn't have a problem with supply," he told anyone who would listen. People said the technology seemed new. Dagleish would ask, "How many of you heat with wood?" Nearly all did.

"It's cheap," he notes. "It's available."

When voters asked why not install a propane system, he adds, "we had the charts to show that the costs of this in the long run are just going to be prohibitive. And that's money taken away from your kids' education."

But the first bond vote fell 10 votes shy of the needed two-thirds majority. Supporters went back to work—and six months later, the proposal passed. In 2005, the biomass system was installed to provide heat and ventilation to the Council schools.

over

Pictured on front: Council, Idaho Superintendent of Schools Murray Dalglish stands by the school's wood fuel bin. Right: Oversized fuel is being rejected from the metering bin.



“The way we put the project together is kind of a model for smaller systems that think they can’t afford to do this,” Dalglish says. “If they can get creative, they can have a nice little project. We created some really strong partnerships between the Forest Service, the county and the schools, and the contractor, with everybody pushing together to make this happen.”

‘Do a Performance Contract’

The process hasn’t been bump-free. Three years after the new system went online, “we’re still only 80 percent done,” the superintendent says. “We’ve been scrambling to get them”—the nationally prominent energy-services contractor, or ESCO, that installed the system—“to finish. Eventually, we had to sue and go after their performance bond.

“The biggest lesson we learned was: Do a performance contract. We have such a great contract because it’s so detailed. It protects us in so many ways.”

But although the ESCO that Dalglish chose was federally approved, he now feels that it did not have a strong track record of working with small facilities like schools. In particular, the company has been unresponsive on fixing system problems that derive from rougher-grade fuel. Council specified that its biomass system should be capable of handling such fuel, but that has not been the case. Dalglish has been pressing the ESCO to make the fix through the system supplier, Messersmith Manufacturing.

“Lesson two: Know exactly what kind of fuel your system is designed to burn,” he says. Council’s is intended to burn ‘hogfuel’, non-merchantable chips that can’t be used in a pulp mill or for other purposes.

“This is the roughest stuff that comes out of the woods,” says Dalglish. “You don’t want to compete against pulp mills—you’re going to pay too much, and the system will not pay off.”

Council has been using storm-damaged wood that the USFS has logged and chipped. The school system has enough of that on hand to last through the 2009-10 heating season.

As for costs, “Let’s do a little math,” Dalglish says. With the old electric and diesel oil systems, “we were looking at \$56,000 to heat our buildings. Last year, I spent \$6,000 on fuel—300 tons at \$20 per ton. I would say we’re saving \$50,000 a year—and I may be underestimating the savings on electricity.”

Environmentally, “the town typically gets ‘smoked out’ for weeks at a time from the nearby burning of slash piles” in the forest, says a USFS report on the Council project. “It made more sense to everyone to burn this slash in a highly efficient boiler.” Overall, carbon dioxide emissions from the wood boiler are essentially zero, while the oil boiler is a big CO₂ emitter.

Now, thanks to another USFS grant, Council’s high school is building a new greenhouse, to be radiant-floor-heated with hot water from its chip system. Students will raise native plants that they will then plant in the national forest, for example, to repopulate flood-damaged riverbanks.

“We hope for the next 40-50 years, we’re going to have this relationship between our kids and the Forest Service,” the superintendent says.

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