

After Twelve Years, School's Woodchip System "Runs Like a Charm"

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**Barre Town Elementary and Middle School
Barre, Vermont
4.5 MMBtu woodchip system
Installed in 1996**

When the Barre Town, Vermont, Elementary and Middle (BTE) School was built in the mid-1960s, its all-electric heat and hot water system looked like a great investment. "It was a steal," says today's co-principal, Dr. Ted Rikken (shown below right, holding chips). But by the time the school was paying a \$180,000 annual power bill in the mid-90s, that notion of a steal had a different meaning.

The school had to do something—and it became one of the first in its home state, and in the US, to seriously investigate woodchip heat. The project would not be small—the baseboard system would have to be ripped out and a network of hot-water pipes installed, along with a boiler and its housing, chip bin, and installation ramp.

"There was trepidation," Dr. Rikken says. "It required reworking the whole way we heated this building." But the local School Board was supportive, encouraged by a forecast that the new system would save \$100,000 per year, and would pay for itself in five years.

"Once you get by the normal, lethargic problem of change within an organization, then the idea that you could save \$100,000 a year from the beginning gets people's attention," the co-principal says. "Our board has been quite adventurous, even bold, in trying to think about BTE and energy usage."

During two years of research on system options in 1994-95, the school also considered geothermal heating, but woodchips won out. The school's new system was installed in 1996, and the forecasts of annual savings and payback time came true.

More than a decade later, Dr. Rikken and Steve Murray, the school's facilities and maintenance director (shown below beside woodchip boiler), say they have given about 20 tours to interested people from around the US and even internationally—engineers, architects, foresters, school superintendents, and others.

"I always tell people, 'Do your research,'" says Murray. "That's what really helped us. We went out and got some good information."



"It's Very Low Key"

BTE's chip boiler operates nonstop about 215 days each year. The school installed two smaller oil burners as backups, but has never had to use them while the chip boiler is running.

It uses the oil units only to provide hot water in the warm season, and occasionally for heat in the "shoulder" heating months during autumn and spring.

The chip boiler uses 650 to 725 tons of hardwood bole chips per year, with the adjacent 65-ton storage bin receiving weekly deliveries during the heating season. Murray's staff rakes out fine ash twice a week, shipping it off in small trash cans, then spends about 45 summer hours cleaning out the boiler and the tubes. In 12 years of operation, the school has had to replace two small motors, at a total cost of less than \$10,000.

"It's very low key," Murray says. "There's no more maintenance than to the average oil boiler."

The school's success with its chip boiler has helped encourage the BTE's board and administration to try other ways of saving energy and/or costs while fighting global warming. For the last two years, the school has shipped its food waste—20 tons the first year—to the nearby Vermont Compost Company in Montpelier, instead of paying to landfill it.

An energy consulting firm, working with the school over the first half of 2008, helped it save over \$10,000 in energy costs, trimming its bill by almost 14 percent—and cutting its production of carbon dioxide by 16 percent, or about 90,000 pounds, according to a June 29, 2008 article in the Barre-Montpelier Times Argus.

Barre Town owns an 88-acre forest, and the school recently was involved with the county forester in a project that saw the woodland logged, some of the culled wood chipped for the school's bin, and a multi-year management plan developed.

"It takes a whole community, both people and professionals, to think these things through," Dr. Riggen says. "The role of the school becomes to coordinate this.



If you can get that kind of synergy going in an organization, to see things in a different way, you can achieve a great end."

And, in a school setting, there is an educational benefit as well. Dr. Riggen, who has a forestry background, recently visited a fourth-grade class. Holding a large maple bole, with one small branch still on it, he was asked what that wood was made of.

"Well, it's made of carbon," he recalls saying. "Where does every bit of carbon come from? It only has one source. Every wood atom, and every woodchip, comes from CO₂—and CO₂ is the enemy, with regard to global warming. We're promoting the growth of trees by finding a use for them, and the growth of trees reduces the CO₂ in the atmosphere. They capture the carbon."

In the boiler house, Murray says the chip system has been "good for the school, and good for the community. I grew up on a farm, and to me it's just another way of burning wood. But the impact ..."

He shrugs. The impact is still widening, like ripples on a very large pond.

"When people come here for a tour, I give it to 'em straight," Murray says. "This is not a chain around our neck. Nobody has complained about a smell, or anything like that. This thing runs like a charm."