

Biomass slow to stoke up

Key Points

- Modern wood-fired biomass furnaces have promising benefits.
- Current prices and biomass delivery costs favor propane.
- Biomass benefit and payback hinge on longer-season use.

BY SUSAN HARLOW

BURNING wood pellets instead of propane hasn't yet had much effect on Justin Rich's bottom line. While biomass heating of his greenhouses works, the payback is longer than he expected due to last year's propane price plummet.

But this Huntington, Vt., farmer expects to expand use of his biomass furnace, bought with a 50% cost-share from a program helping vegetable producers substitute renewable fuels for propane and other fossil fuels. He installed a 250,000-Btu outdoor furnace in spring 2014 to heat a greenhouse and an adjacent high tunnel during spring propagation season. Now, it also heats irrigation water for starter plants.

The boiler worked well, he says. Heating the two units to between 60 and 65 degrees F last spring took 8.5 tons of wood pellets and shelled corn. Because pellet prices were up 10% and propane prices tanked, 2014 cost savings were slight. Lack of bulk delivery options for pellets was another drawback. He was left with a large pile of tough-to-recycle polyethylene pellet bags.

A sweeter benefit

Using the furnace further into the season is key to paying off the system faster. "It's more than a 10-year payback — not short," says the certified organic farmer. "We'd like to find ways to use the boiler more. To really make it pay back, you need to be heating more than a greenhouse."

So Rich plans to use Burnt Rock Farm's furnace to cure sweet potatoes, his most profitable crop. Curing sweet potatoes requires holding them at 85 degrees for six days after harvest. He's piping the furnace heat into a 40-foot container installed next to his greenhouses to cure the potatoes. Eventually, he'd like to heat water with the furnace to warm his house.

Rich and five other Vermont producers purchased biomass-fueled heating systems through the Vermont Greenhouse Biomass Heating Project, the unofficial name for a collective effort by several funding sources and research, Extension and education programs.

"They're relatively inexpensive, but more reliable than the ones initially used by these growers. They stay lit and are



COLD-WEATHER HEAT:

Justin Rich expects to use his biomass furnace to cure sweet potatoes plus heat his greenhouses.

multi-fuel," says Chris Callahan, University of Vermont Extension ag engineer.

Callahan tests each unit to confirm its efficiency, smoke level and carbon emissions. "One point of the program was to methodically capture lessons learned and improve the practice as a 'learning community.' We've seen that happen," he adds.

Callahan calculates that a typical installation in the project will displace about 600 gallons of propane a year. With propane at \$3 per gallon and wood pellets at \$250 per ton, that's a net savings of \$1,000 per year and a payback of 10 to 12 years for the systems (without the cost-share incentive). That saves about \$360,000 over the 10-year expected lifespan of the equipment.

Slow payback problematic

Jon Satz of Wood's Market Garden in Brandon, Vt., bought a 500,000-Btu biomass boiler through a similar cost-share program. He uses it to heat two of his seven

40-by-144-foot peak-vented greenhouses, where he grows in-ground plants in the spring — tomatoes, cucumbers and basil.

He, too, is finding that the biomass payback is difficult when the heat source is only used for a short part of the year. At current fuel prices, the biomass furnace would take 15 to 20 years to pay back. If he had paid full price for the furnace, "I don't think we'd ever pay it back," he says.

Satz also ran into technical glitches. Controlling wood-fired heat proved more difficult than with propane. Even so, he's still optimistic about heating with biomass, and would eventually like to use wood chips.

He now burns 16 tons of pellets and more than 3,000 gallons of propane in the spring. "We have a lot more propane we'd like to convert over."

Vermont's cost-share program was built on earlier initiatives that showed growers needed more reliable and easier-

One crop offers sweet payoff

WHEN Justin Rich bought a foreclosed farm in Vermont's narrow Huntington River Valley seven years ago, other farmers were supplying local markets with summer vegetables like tomatoes and sweet corn. Rich started growing storage crops such as onions and potatoes at his Burnt Rock Farm, plus another crop seldom grown in the Green Mountain State — sweet potatoes.

"Sweet potatoes really did it for us," he affirms. "It was one of the last main crops not being grown."

Rich had learned how to grow them in New York's Hudson Valley, where he grew up. "They need a lot of heat. But there's not much disease or pest pressure."

His 2 acres of sweet potatoes yield between 12,000 and 22,000 pounds per acre. He transplants slips from North Carolina into black plastic containers, using a hand-built transplanter that cuts a small hole.

After curing, the crop is stored at 55 degrees F in an insulated, climate-controlled storage barn built four years ago. "Most cool-climate storage crops have a built-in dormancy; sweet potatoes don't. So you cure them for six days at 85 degrees, put them in storage at 55 degrees, and then just wait," he adds.

On his 8 tillable acres, plus 4 acres rented from neighbors, Rich also raises certified organic white potatoes, winter squash, garlic and onions. During summer, he grows several acres of baby spinach and a greenhouse each of eggplant and cherry tomatoes.

Rich's 1,600-square-foot storage barn is a key part of his operation. Equipped with radiant-heat flooring, it provides three zones that can be controlled for heat and humidity. It keeps his other storage crops in good enough condition to make half of his annual sales between Thanksgiving and April.

Most of Burnt Rock Farm's sales are wholesale. It's part of a multi-farm Community Supported Agriculture group in nearby Burlington, Vt., and in Boston, and at the Intervale Food Hub. He also sells to several Burlington grocery stores and through Farmers to You, an online CSA.

to-use heating units. It was obvious the longer the heating season, the shorter the payback time and the more economical the heating systems.

As more growers extend their greenhouse season, biomass heating becomes more practical. Heating with biomass will help cut carbon emissions and save on fuel costs, according to Callahan.

There's also an advantage to relying on a locally sourced fuel. New England has no biomass shortage. And Rich says: "I prefer the smell of pellets to the sound of the propane truck backing down the driveway."

Harlow is from Westminster Station, Vt.