Alternative Energy: Does it PAY?

Jennifer Duffield White

Over the last few years, GrowerTalks and GreenTalks have reported on retailers and growers who’ve invested in alternative energy systems. Yet, for every business that has taken the plunge, there are many more who’ve stood back with a wait-and-see strategy.

The real question is, after a year or three in operation, do the owners still have good things to say about these systems? Some do, and some don’t. And as you’ll read below, nearly everyone has had to make some tweaks. We caught up with five businesses to see what they have to say about their investments.

Living in the Garden

In July 2008, Living in the Garden, a garden center in Pullman, Washington, installed a grid-tied, 3060-watt solar photovoltaic system. “It was designed to offset 100% of our business’ electrical use,” says co-owner Suzanne St. Pierre.

The system includes 12 Sharp 170-watt panels mounted on a Zomeworks passive tracker with a Fronius IG 2000 inverter. With the tracker, the panels passively follow the sun from east to west during the day; they use the sun’s heat to move liquid from one side of the array to the other, and gravity does the rest.

The cost of the project totaled $22,500, but Suzanne points out that they also had a lot of incentives and tax breaks, including:

- No state sales tax on equipment or installation.
- One-time 30% federal tax credit ($6,738)
- Depreciation of $4,100 for the first year (five-year property for tax purposes)
- Annual Washington State Production Incentive program ($459)
- Electricity bill they’ll no longer incur

For Washington’s production incentive program, Living in the Garden receives 15 cents per kW of solar power produced (good through 2020). However, if you have solar panels and inverters that are manufactured
in Washington state, that incentive gets bumped up to 54 cents per kW. Suzanne says a system like theirs, if it’d been manufactured in-state, would be garnering them $1,652 per year until 2020—a total of $18,176.

Suzanne says of her investment, “Part of the decision was emotional. It feels great to say, ‘Just like plants, we get our energy from the sun.’”

However, it’s also been a wise business decision.

“Going solar works well for us at retail. It sets us apart from other garden centers and is a strong symbol of our commitment to our community and our environment. With a greenhouse expansion planned, I’m currently researching energy conservation and renewable sources for greenhouse heating (they currently heat with propane),” Suzanne says.

Any regrets? None. She reports that they haven’t had any maintenance issues or duties, and the panels carry a 25-year warranty.

“My only worries have been slight snow accumulation reducing output on the panels, and some days it is too windy for our passive tracking system to overcome the force of the wind,” says Suzanne. “At the end of its first year, the system has outperformed its expected output, so these worries were unfounded.”

Thinking about installing solar? Suzanne says these two websites were valuable resources:

- **www.findsolar.com** This site will provide you with solar contractors in your area.
- **www.dsireusa.org** This site is a national clearinghouse on all local, state, federal and utility incentives relating to renewable energy and conservation.

**Pleasant View Greenhouses**

In 2008, Pleasant View Gardens, a wholesale grower based in Loudon, New Hampshire, received a $500,000 renewable energy grant for a new biomass burner, which they installed at their Pembroke facility in January 2009. They estimated that the burner, fueled by wood chips, would cut their Pembroke facility oil use to zero and potentially cut their heating costs by 85%.

The $2-million price tag on their Hurst biomass burner and boiler may seem steep, but not when you know their fuel bill at the Pembroke facility ran about $1 million each year. With a year of operation under their belts, co-owner Henry Huntington says that they’re pleased with their investment. In 2008, based on the current price of oil, they were calculating five years to realize the ROI. “This year with the [lower] price of oil, it knocks it up again,” he says. “But we definitely expect the cost of fuel oil to go back up again at some point.”

Henry notes that the grant they received plays a major part in making this such a short ROI in what would otherwise be a much longer-term investment. The other factor that helps their ROI, he explains, is that they’re in the cold northern climate of New Hampshire and as a propagator, they need warm early-season temperatures for rooting. Thus, saving money on that amount of heating makes a big impact on their bottom line.

The biggest learning curve for Pleasant View was figuring out wood chip quality and type. “Once we learned
what we needed to buy, it ran much smoother,” says Henry. The cheaper whole-treed chips that they initially bought included twigs that didn’t get completely chopped up in the grinding process. Those twigs then jammed up the screen as the chips were being fed into their biomass system. Pleasant View has since moved to a more expensive bole chip (composed of wood from the tree trunk, without twigs). In the future, “we will probably invest in a better screener so we can be more flexible on chips and save on fuel,” says Henry. Such a screen would also give them the ability to take landscape debris.

Henry’s advice for the grower thinking about a biomass boiler? “Make sure you understand completely what your heat loads and heat costs are in order to get a payback. You need that critical mass of heat load to make it worth it.”

The other crucial part is to thoroughly investigate what your fuel source will be. “It’s all about fuel availability,” says Henry. Pleasant View is located in a region where wood chips are easy to come by, and they anticipate having good availability into the future. “Of course, we’ll always be on the lookout for alternative fuels,” says Henry. “I think that’s what our job is.”

**Eagle Creek Growers**

In the fall of 2006, Eagle Creek Growers, based near Cleveland, Ohio, installed a biomass boiler. In March 2009, they added wind turbines to their alternative energy system. Like other biomass burner owners, Eagle Creek remains pleased with the investment, even as they’ve tweaked it.

**Biomass.** The heating system is a 300-hp Hurst “vertical underfeed” boiler that can burn nearly any fuel that has about 20% or lower moisture content. They’ve kept their fuel choice local, but they’ve had to switch it up a bit. When they started out, Eagle Creek burned cow manure from the family’s 1,000-acre farm, blended with sawdust or wood chips and shredded tires. (The farm also has a sawdust business.) However, they stopped using sawdust as bedding for their cattle when it became more expensive. Instead, they now primarily burn horse manure from nearby farms (who receive shipments of sawdust from Eagle Creek).

When we spoke with owner John Bonner in March 2007, he expected payback to happen in four to five years. Now, as they enter their fourth season with the biomass boiler, he says he thinks it has already paid for itself.

**Wind power.** Eagle Creek installed a 50KW wind turbine less than a year ago, with some help in the form of federal and state alternative energy grants from the USDA and the Ohio Department of Development. They expected the single turbine to reduce annual energy consumption by 30% to 40%.

Since they haven’t yet completed a full year with the turbines, John is still waiting to see if that projection will ring true. (Especially since the majority of the wind will occur in the as-yet untested winter months.) March and April of 2009 registered well, and energy production fell off during the summer, as expected. However, says John, “It was still lower in the summer months than we hoped.” The turbines are not made for low-velocity winds, and they had more days than anticipated where the wind didn’t pick up enough for the turbines to work.

A second wind turbine will go up next fall, thanks to another set of government grants.

**Biodigestion.** The new technology that Eagle Creek is looking into—the one John is most excited about—is a
biodigester that would create energy from cow manure at the farm. We’ll keep you updated as that develops.

**Pork & Plants**
Pork & Plants in Altura, Minnesota, was one of the first greenhouses in the United States to look at biomass boilers, and now they’re even making their own pellets—a venture that earned them Innovator of the Year from the Agriculture Utilization Research Institute (www.auri.org).

“When you’re trying something new, you’re a guinea pig, to a degree,” Eric Kreidermacher admitted to us several years ago. He calls their first corn burner “a total nightmare.” The majority of corn burners were geared for residential use, and the commercial-sized ones were often for operations of 50 acres or more. As a grower that also has a pig barn (thus the “pork” in their name) and 65,000 sq. ft. of greenhouse space to heat, there wasn’t a lot of information to go on.

They now operate five biomass burners that have been burning pellets. Until recently, they were burning corn and wood pellets that they purchased. But at 600 tons of pellets a year, it was still a costly venture that the Kreidermachers wanted to make more efficient and sustainable. And so they bought their own pellet mill, which began operation in March 2009 with the idea that they’d produce their own pellets. (In 2006, they’d also planted 20 acres of native prairie, with the plan to pelletize the perennial grasses.)

Once again, they find themselves in the position of being a pioneer in this field. Maria Kreidermacher reports that they love operating the pellet mill. “There’s no way we’d ever go back,” she says. But she also says there’s no one else doing the same thing, and so finding information has been difficult. “It’s been a lot of trial and error.”

Pork & Plants uses “residue” from crops grown on the farm to make the pellets—corn stalks, bean stalks, prairie grasses and so on. They’ve found that certain materials burn better than even wood pellets. Currently, they’re heating 100% of their greenhouses with the homemade pellets, and they’ve started to supply a few local people, as well. We’ll check back in on Pork & Plants after their first year in the pellet business to find out what lessons they’ve learned.

**Lohmeyer’s Farm**
Lohmeyer’s Farm in Maryland, part of the Bell Nursery Network has a 1-acre wholesale production greenhouse whose high propane bills started to cut into the bottom line so much that they decided to invest in a grain-fired boiler to “save money and to support the farm economy.” They bought a Pelco 2520 Boiler in 2006, with plans to use it for 75% of their heat, with the propane heaters providing the rest.

Overall, the boiler integrated easily with existing environmental controls. One mistake owner Charles Lohmeyer says they made was putting extra heat exchangers in their design. “The heat exchanger output needs to be matched to the boiler output or else the boiler water temperature drops and the boiler thinks the fire has gone out and does a safety shutdown,” says Charles. They ended up using only four of the eight heat exchangers and two of the four distribution side pumps.

Charles says that the new heating system cost them $75,000. At the time, with corn at $2.75 a bushel, they thought they’d be saving $21,000 a year in fuel, giving them a return on investment in 3.5 years. The reality of
their first year in 2007 was that they paid $4.25 for corn. They burned 6,300 bushels of grain (one-third barley and two-thirds corn) that year, costing $22,000; and they burned $4,000 of propane (at $1.62 per gal.). Rather than replacing 75% of the propane, they actually replaced 90% of the propane with the grain-fed heat. All in all, they saved about $14,000 in heating costs, in a year which Charles said was on the mild side, temperature-wise. They are now looking at a ROI of 5.5 years.

The Lohmeyers quickly learned that barley would be cheaper than corn, but it did require a few adjustments and one big additional investment. For starters, barley produces three times as much ash and fly ash. They had to retrofit the boiler with a stovepipe to collect fly ash coming off the cyclone. They shut down the boiler during the day on sunny days, which gives them a perfect opportunity to clean out the clunkers and empty the fly ash bin—a task that takes about 30 seconds.

When the Lohmeyers decided on a grain-fed boiler, they figured they’d have a great supply of fuel, since there were six grain elevators within 30 miles of their operation. “We found that the local elevators were not set up to sell grain on an as-needed basis. They would sell to us only when they were shipping themselves,” says Charles, noting that it was a hassle to arrange deliveries. Then, by mid January, all the elevators had run out of barley and the Lohmeyers had to go back to $4.25 corn.

The solution was to invest $20,000 in a 6,000 bushel storage bin. They filled the bin with barley from a local farmer at the reasonable rate of $2.30 per bushel. “Problem solved,” says Charles. But it also means they’re looking at a “very long investment.”

This year, Lohmeyer’s Farm is burning 100% barley. But like other growers with a biomass system, Charles is also keeping an eye on other fuel sources. “We are also looking at using switch grass if it can be pelletized economically,” he says.

Jennifer Duffield White is the author of GreenTalks, Ball Publishing’s e-mail newsletter on sustainability. She lives in Missoula, Montana. If your greenhouse or garden center has invested in a green technology, she’d love to hear what your experiences have been. You can e-mail her at jwhite@ballpublishing.com.