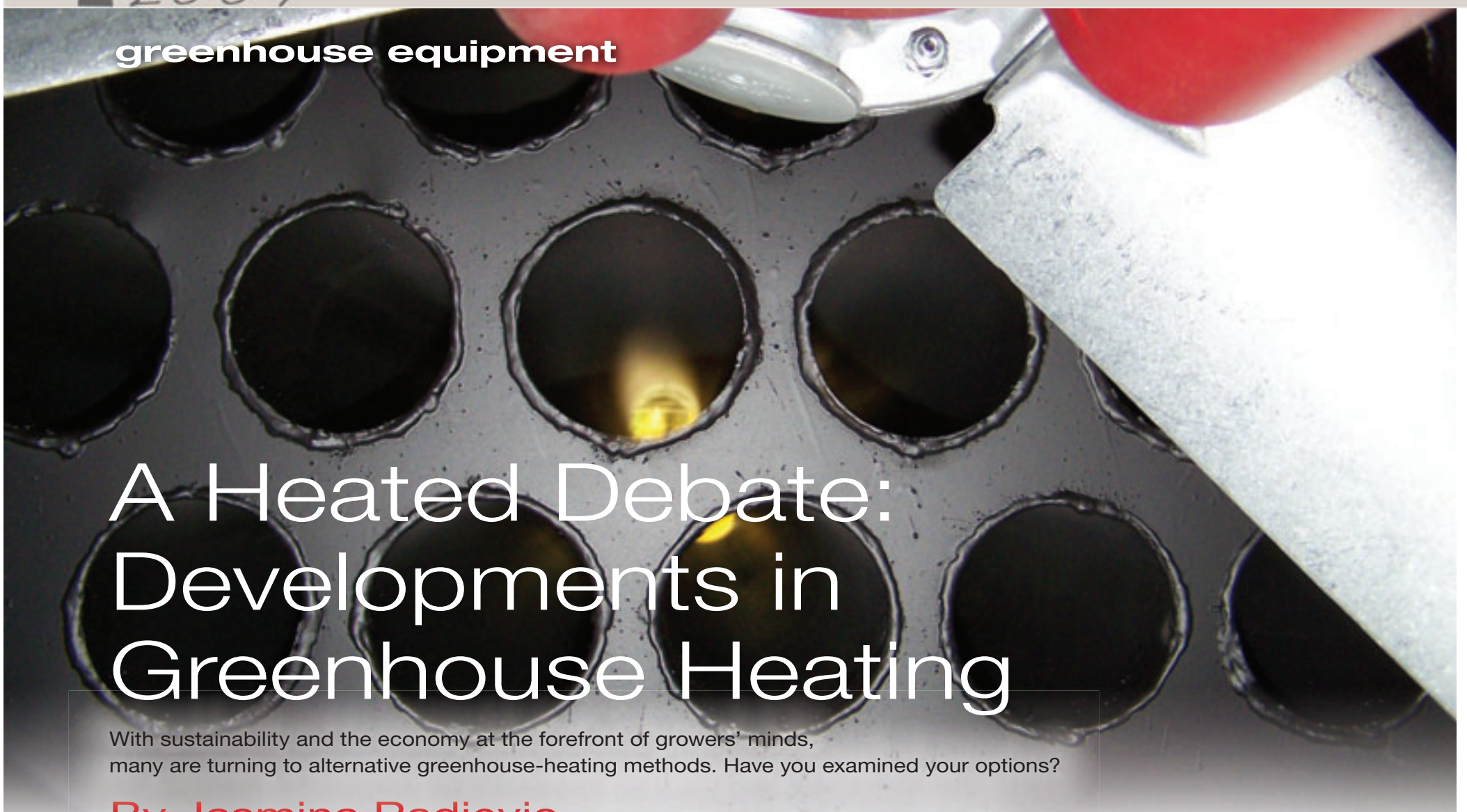

A Heated Debate: Developments in Greenhouse Heating

With sustainability and the economy at the forefront of growers' minds, many are turning to alternative greenhouse-heating methods. Have you examined your options?

By Jasmina Radjevic

The shaky economy and rising energy costs are nothing new to growers. These issues continue to be on our minds, and growers are constantly seeking ways to offset input costs. And the place to start is inside the greenhouse.

According to John Albright of Elizabethtown, Pa.–based Total Energy Solutions, the biggest challenge for growers is identifying areas where they could be more energy efficient and being able to purchase equipment or systems that would increase their efficiencies without spending large amounts of money. "The selection of equipment or systems is very important with our current economy, since it could mean the difference between staying in business or going out of business."

Above: *Pleasant View Gardens in Pembroke, N.H., earned a grant for its new biomass boiler system. (Photo: Pleasant View Gardens)* ***Top:*** *With biomass burners, the fuel enters a burn chamber, where air is incorporated with the biomass, which creates a hot, complete burn. (Photo: SAR Biomass)*

Determining Costs

For many growers, the most difficult task when trying to create an energy-efficient greenhouse environment is determining costs per growing area and then making informed decisions on what heating equipment can help reduce energy costs. Heating a greenhouse is a huge investment and cannot be taken lightly. You must make sure the products you invest in can be used long term.

"Many facilities have different types of growing areas heated by different methods but all on a single gas meter," says Jeff Deal, president of Hamilton Engineering, Inc. "It is difficult to pin down actual cost per square foot of growing area." He says the next biggest challenge is making the financial commitment.

With so many business owners struggling to get by, investing in such a costly system may seem impossible. However, the payback could be well worth it. Growers may also want to look into available federal grants.

For instance, just last month, Pleasant View Gardens announced the addition of a new biomass burner at its Pembroke, N.H., location. They earned a half-million-dollar renewable energy grant toward this effort. The company estimates a potential 85 percent cut in heating costs as the new biomass burner will eliminate the need for oil. The new system reportedly cost Pleasant View Gardens $2 million. To supplement this cost, Pleasant View applied for the federal Renewable Energy and Energy Efficiency loans and grants program. They ultimately earned one of the largest grants of its kind in the green industry. The company reports a decrease in total oil use from 600,000 gallons to 350,000 gallons.

With or without a grant, the payback on using a biomass system may be well worth the investment. "A fairly simple financial analysis can be done to evaluate the return on investment to install a biomass boiler system," says Gene Zebley, who is in charge of marketing Hurst Boiler's biomass systems. Most manufacturers will assist in evaluating a grower's current system and figuring out available options.

Fuel Supply and Management

The biggest difference between biomass heaters and traditional heaters is that biomass heating requires alternative fuel sources. "No fossil fuel will be used, making them CO_2 neutral," says Dennis Van Alphen, general manager of Total Energy Group Inc. in Summerland, Calif. "The biomass fuel that is being burned has

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Be on the Lookout

Many heater manufacturers have even newer technology in the works for growers looking to be more energy efficient. One new development by Hurst Boiler is regenerative power production, which makes electricity from waste heat that would have normally gone out the exhaust back.

"It's a little generating system that can be hooked up to an existing process where heat is being lost or being exhausted," explains Gene Zebley. "Those are wasted BTUs when they go out the door. These systems recover that heat and make electricity with it, on very small scales."

New developments in pellet equipment relieve growers of oil dependency. (Photo: Total Energy Group.)

Total Energy Group is also introducing some new products. They are focusing primarily on fuel densification of high-carbon grasses, such as miscanthus and switch grass. "We offer pellet equipment where the growers can grow these grasses and produce their own pellets," says Dennis Van Alphen. "This will make the growers oil independent."

Wood pellets are generally manufactured from wood waste and can be used as a substitute for electricity or fossil fuels, such as propane or natural gas. Pellets have 5 to 10 percent moisture content in comparison to 30 to 60 percent for other wood products.

absorbed CO_2 before it was harvested for fuel purposes, so no CO_2 is added to the environment."

Besides undertaking such a big financial responsibility, choosing a supplier is critical when installing a biomass system. Growers must research all supplier possibilities and also closely monitor that supplier after installation.

In all his presentations, Zebley discusses fuel supply and fuel management. "The biggest problem we have with clients is the first thing they do is try to get the cheapest stuff they can get," admits Zebley. "What they don't realize is they might be saving a few bucks now, but they're going to end up spending big bucks on repairing worn-out equipment."

Keep in mind that biomass fuels are unregulated, from both a price and delivery standpoint, and the BTU content can vary greatly as well. This means that the fuel source that the biomass heating equipment's purchase was originally based on will often become drastically more expensive or unstable in the year or two following the purchase.

According to Van Alphen, one disadvantage to using a biomass system is the inconsistency of biomass fuel. Growers must keep a close eye on available resources before committing to a fuel source. "Woodchips have an inconsistent BTU value, and due to their large volume, they have a higher logistical cost," he says. "And corn products are a food source as well, so pricing of corn is based on human needs."

Fortunately, systems can be adjusted to be able to use a different fuel source than originally intended. One Hurst Boilers installation was originally designed to use corn as a fuel, when corn was cheap. "But between the time they purchased the system and when it was actually installed, corn more than doubled in price," shares Zebley. "So we modified the system to use wood waste."

Another fairly recent installation by Hurst allows the grower to mix in a bit of manure with the woody biomass.

According to Deal, locking in a long-term, multiyear fuel supply source from a reputable organization is key to making the biomass heating equipment provide the intended results.

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Heater Maintenance

There are a number of non-certified products being marketed to the greenhouse industry that have extremely high exhaust pollution counts, says Deal, and they require substantial manual labor to make them work. Many states require specific maximum levels of exhaust pollution, and that trend is growing. Some products may not meet these levels, so the purchaser needs to be sure that the product meets current and proposed future regulations.

The current drawback to natural-gas heaters is that they are limited in their horsepower capacity, so they are not as cost effective as a lone source of heat for a multiacre facility. (Photo: Hamilton Engineering)

"If the product will require more manual labor to operate, the purchaser needs to be sure and take the cost value of that into the payback scenario."

An important difference between traditional heaters and biomass heaters is that biomass heaters will require a bit more maintenance. With standard boilers, growers simply flip a switch and let the boiler work on its own.

On the other hand, with biomass systems, growers receive truckloads of fuel that must be inspected to make sure it meets their specifications. The fuel also must be stored somewhere. "That's a lot of moving parts," says Zebley. "You have to make these things work; they don't work by themselves."

That being said, in most greenhouse operations, the boiler operator may walk in the boiler room once a day or once in a shift, says Zebley. "He'll just go in, check his fuel supply, check the combustor, and go around and grease a few bearings."

Ultimately, Albright says, "this amounts to about 15 to 20 minutes per day, which is a small sacrifice compared to the amount of money that can be saved each year." GPN

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