

Barrels per day

12,000

9,000

6,000

3,000

Controlling Energy Costs

Fuel prices are increasing rapidly, and growers are feeling the pinch. Learn from a fellow grower about greenhouse technology that can help keep your costs down throughout the energy crisis.

By William Swanekamp

Fuel prices are going through the roof. We see it every day at gas stations with gas prices around \$3 per gal. and when we receive winter oil deliveries at our homes. Our businesses are not immune to these upward trends, and in many cases they are impacted much more. There is one thing for sure about growing plants and flowers — they need heat and lots of it.

When I tell my friends outside of our industry how much we spend each year on energy bills, they shudder. We, on the other hand, have grown used to and maybe even immune to these upward pressures. Could it be that we just don't want to think about it? Or maybe we think it will go away! There is one thing for sure: Energy prices will continue to be high for some time to come. That being the case, what can we do to lower energy costs?

What Is Behind The Increases?

Since 2001, oil and natural gas prices have increased dramatically. If you haven't looked yet, the prices for winter 2006 are 44 percent more than 2005! What factors are driving these increases? The number-one factor is China. The global demand for oil and gas is increasing dramatically. China alone required 40 percent more energy for 2005 than in 2004. New reserves of oil and gas are limited and hard to get. There are no new, unknown, massive oil fields begging to be found. Most of what is yet to be explored is deep under the sea or buried under many feet of snow and permafrost.

In this country, we are just as dependent on foreign oil as we were in 1973 when the OPEC oil embargo occurred. This has developed because our country has had no clear energy policy for the past 10 years. Every day, U.S. automakers roll out larger and larger SUVs, and Americans buy them up. Additionally, the major oil companies have invested very little in new refining capacity in the past 10 years. In fact, refinery capacity has gone down. This means the refineries have to run at virtually 100-percent capacity to meet the demand. This, of course, drives up prices as long as the supply is restricted.

Finally, we must mention the role of the commodities traders. There was more natural gas in storage for July 2005 than at any other period of time; yet, the prices were at very high levels. We do not have a shortage of natural gas, and prices still are inflated. What is going on? Future traders are keeping prices up by speculating. This artificially inflates gas prices and does not allow the natural process of supply and demand to work its magic.

What Can You Do?

Double-poly with infrared radiation (IR), heat curtains, heated floors, cogeneration and waste heat all have a role to play in managing energy usage and costs. These are all excellent strategies and should be applied. But even more can be done.

To manage energy costs, we first need to know them. Do you have a firm grip on your

energy costs as a percentage of your gross sales? You should. This will reveal any long-term trends toward inefficiencies. At Kube Pak Corporation, we have seen our energy costs average 3.6 percent of our gross sales. Keep in mind, we produce plugs and rooted cuttings during the dead of the winter, and this will tend to increase our percentage substantially. But the trend throughout the past three years indicates this percentage is going up (see Figure 1, page 46).

Check Your Boiler

One way to manage energy costs is to invest in new burner equipment. (It is assumed that you are generating heat from a boiler and not a hot-air furnace to take advantage of the following suggestions.) Older boilers use what is called linkage control for maintaining the air/fuel mixture. This is important, since a poorly tuned boiler will use far more energy than one that is properly tuned. One limitation of linkage control is that it is very difficult to keep the settings accurate.

On the other hand, servo motor control is very precise and seldom gets out of calibration. The biggest advantage of servo control is when it is coupled with a computer to control all the capabilities of a burner. For example, AutoFlame makes a control package that, when coupled with a fully modulating burner, can increase your boiler efficiencies 10-20 percent. This is possible because the burner will modulate to fire at a rate sufficient to warm your greenhouse to the proper temperature. We installed six boilers equipped with Limpsfield burners and AutoFlame controls, and we have seen excellent fuel savings. Each boiler is capable of a 5-to-1 turn-down ratio. This means if you have a boiler that produces 1 MBTU at maximum fire, it can reduce its firing rate to burn 200,000 BTU, which is one-fifth of the maximum.

This is important to our industry, since our energy demands vary greatly and often. There is nothing less efficient than a boiler that is not running. Your goal should be to have your boiler start heating at 5 p.m. and continue to run until sunrise the next day. If a boiler cycles on and off all night long, wasted heat is going up the stack during its off period. If you have a fully modulating burner, your boiler will match its input to the greenhouse's output or heat loss. With the servo motor control, fuel efficiency is maintained throughout its firing range — no wasted fuel up the stack, therefore, lower energy bills.

In addition to these strategies, if you install at least two boilers, you can take advantage of what is called lead lag. This is a situation where one boiler is the lead boiler and comes on first. The lag boiler only comes on when the first one cannot keep up. Why is this beneficial? By only running one boiler when the heating load is low, you maximize the efficiency of your heating plant. If you have a 5-to-1 turn-down ratio with one boiler, when you use the lead-lag option with two boilers, your turn-down ratio goes up to 10 to 1. This means even greater energy efficiencies and fuel savings.

Use Multiple Energy Sources

Another way to manage energy costs is to employ dual-fuel burners. This can be done using natural gas with oil, propane with oil or natural gas with propane. What is the advantage here? If you use natural gas for your primary fuel, the local utility is probably charging you what is called a demand charge. This is calculated by the utility and is based on the number of therms you use during a billing cycle and the number of days in the billing cycle. For example, if you use 60,000 therms in a 30-day period, your demand charge is 60,000 divided by 30, which equals 2,000 therms per day. The utility multiplies this number by \$3.50. The result is \$7,000. This amount is then charged to your account on top of the charge for the actual gas. This is usually rolled over from month to month until a lower demand charge is realized. In some cases, the utility will continue to charge you for your peak demand charge over the next five peak heating months of November through March. It is very complicated, and you should check with your utility to see what its tariff allows.

The point is clear — if you can burn an alternative fuel when the utility requests, you can eliminate this demand charge. To accomplish this, we had to switch from a firm gas contract to an interruptible service. This means we had to be able to switch over to our alternative fuel, which is oil, in about eight hours. Last year, we burned about 60,000 gal. of oil during interruption. We saved more than \$55,000 in demand charges in 2005 alone. Over a 10-year period,

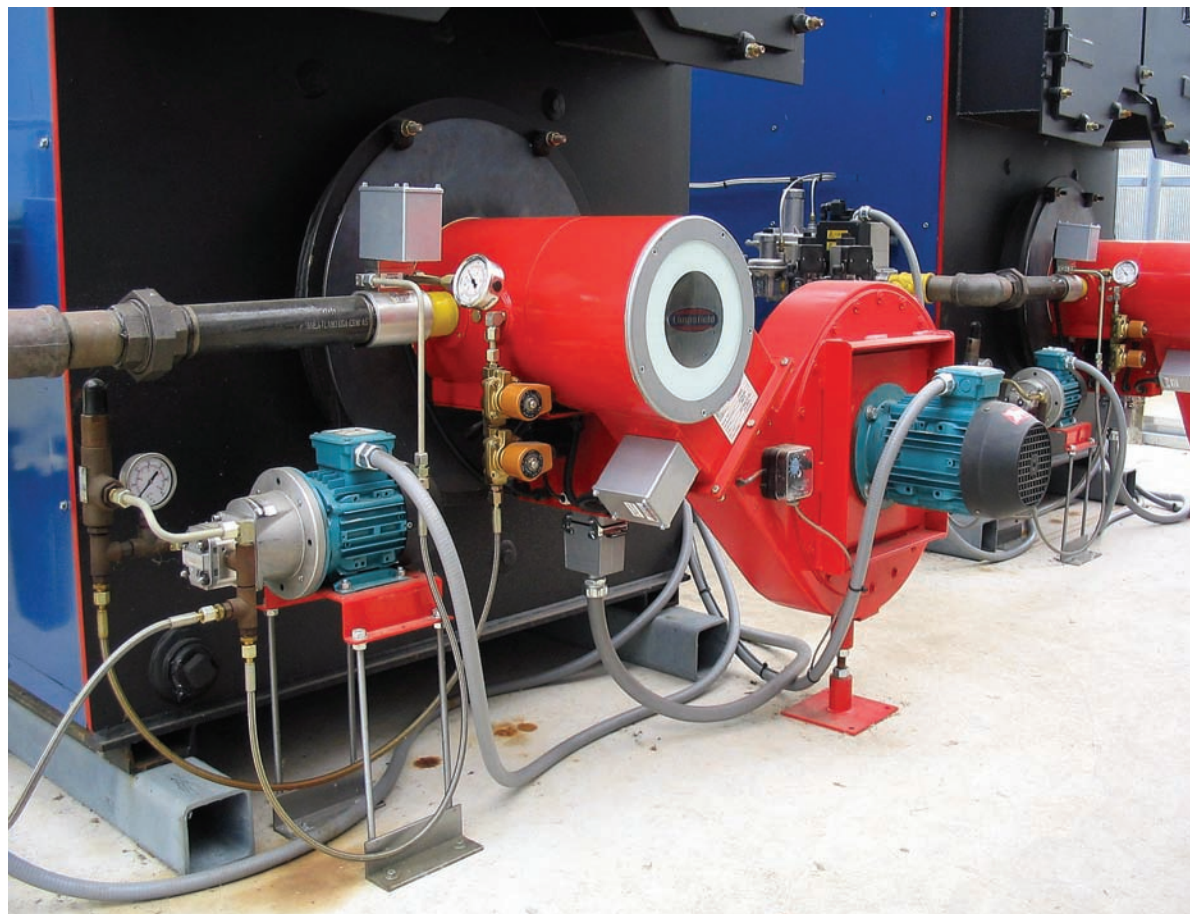
this savings is \$550,000 — certainly not a number we would want to ignore.

The Possibilities Of Futures

Another possible strategy for saving on fuel is to pre-purchase your energy on the futures market. Although there can be considerable savings, the proper way to look at buying on the futures is that you guarantee a stable fuel price during the entire heating season and can therefore properly price your crops for the following year.

The biggest downside to purchasing on the futures market is there could be a substantial drop in the price of fuel at the time of your scheduled delivery, and you will not be able to take advantage of this situation. Typically, in the middle of winter this seldomly happens. In fact, just the opposite happens. Prices skyrocket during December through March.

To buy one oil contract requires that you purchase 42,000 gal. of oil and take delivery of that oil in one month. This may not be practical for the small grower; but for the larger grower, this can be accomplished if you have sufficient storage capacity. In October 2003, we purchased a future contract on oil for delivery in February 2004. The price of the contract was \$.94 per gal. When we took delivery of the oil, the market price was \$1.15 per gal. We saved about \$.20 per gal. on 42,000 gal. This is a savings of \$8,400. The advantage of this system is evident. The most difficult part of the process is to decide when to purchase your contract. The tendency is to wait until the price is as low as possible; but in my



We installed six boilers equipped with Limpsfield burners and AutoFlame controls at Kube-Pak, and we have seen excellent fuel savings. (Photos: Kube Pak Corp.)

Kube Pak's Energy Costs As Percentage Of Gross Sales

Year	ENERGY COST MEASURED BY	
	Percent Of Gross Sales	Cost Per Sq.Ft.
2002	2.86%	\$0.42
2003	4.87%	\$0.75
2004	5.28%	\$0.84
2005	3.7% through May. We anticipated more than 5 percent for the year.	Not Yet Known

Figure 1. At Kube Pak Corporation, energy costs average 3.6 percent of gross sales. The trend over the past three years indicates that the percentage is going up.



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experience, you seldom hit the market low. It is better to have a target price range and lock in when you are comfortable.

When purchasing natural gas for the winter months, you are really buying a futures contract from a third-party vendor. It is important to lock in your price for the primary heating months (November to March) in the summer or early fall. Historically, natural gas prices spike during the winter months and are considerably higher than what you can obtain from a yearly contract. The key to getting the best price is paying attention to the market swings. This means going on the Internet and tracking the daily NYMEX price of natural gas. Over time, you will become familiar with the current trends and can make an informed decision about when to buy.

Think About The Future

It appears we are heading into a period of rising fuel prices and stagnant crop prices. This means we have to be even more conscious of reducing costs. We can all have a substantial impact on our fuel cost by following the suggestions outlined in this article. Can we survive during this unfavorable economic climate? Yes, but we need to be very careful of managing our energy costs properly. It might mean investing in a hot water heating system; although expensive, it offers the most in the way of energy savings. Get acquainted with your local utilities energy tariff. The utility may offer you incentives if you reduce your overall energy use. See if you can take advantage of interruptible gas service.

Whatever you do, don't stand still! The rest of the world economy is moving forward, and the demand

for energy is going to continue to increase. Therefore, do all you can now to take advantage of the latest greenhouse technology to reduce your energy costs, and hopefully, you will stay competitive. **GPN**

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