

# How Are Greenhouse Growers Coping With Rising Energy Costs

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## **Significance to Industry:**

In 2003, the average greenhouse in New Jersey spent 5.3% of sales on heating fuel (Brumfield, 2007) and had profits of 9.4% of sales. Up until the middle of 2008, crude oil prices continued to rise and reached a high of \$147 per barrel. Fuel oil used to heat greenhouses almost tripled in price, but has since come down to levels experienced during the middle of the decade (US DOE, 2009).

If, as expected, oil prices start to climb again, a typical commercial greenhouse operation would experience significant difficulty making a profit, and the industry would be in peril. Significant parallels, but also some significant differences exist between now and the energy crisis of the 1970s. The general consensus remains that fossil fuels represent a finite supply that must eventually be replaced with sustainable energy resources and that it is prudent for our country to take steps to free itself from its dependence on foreign oil.

Modest oil prices following the early energy crisis and through the 1990s have shifted much of the attention away from increased self-reliance and/or the development of alternative energy sources. The results of research efforts in the 1970s and 1980s led to substantial reductions in greenhouse energy use (double polyethylene greenhouse films, energy curtains, root-zone heating, and environmental controls). Now that the most obvious and effective steps to reduce fossil fuel consumption have been taken, further significant improvements are much more difficult (and costly) to identify and implement.

In a 2003 mail-in survey of the New Jersey greenhouse industry, we found that 61% of respondents were considering energy saving technologies, 17% were considering alternative energy sources, and 10% were considering co-generation. We conducted this 2008 survey to obtain information to help growers find ways to cope with ever increasing energy costs. One option some growers can consider is to produce their own bio-fuels. We wanted to find out how many growers had enough land to consider this option. We also wanted to know how growers were handling the fuel cost increases.

## **Nature of Work:**

A total of 397 surveys containing a list of 21 questions related to energy use were mailed to greenhouse growers in the state of New Jersey in **September 2008**. A total of 56 (a 14% return-rate) usable surveys were returned.

## Heating Fuel Type

Oil, propane, and natural gas were the most common types of heating fuels used either alone or in combination as their primary heating source by the respondents (Table 1). Wood, kerosene, and bio-fuel were each the primary heating source for one respondent. Oil, propane, and wood were the most common secondary fuel types respectively. Natural gas, electric, natural gas/propane, and fuel oil/wood were the secondary fuel type for one respondent each.

**Table 1.** Primary and secondary fuel type by numbers and percentage of respondents using them.

Fuel	Primary Fuel Type		Secondary Fuel Type	
	Number	Percent	Number	Percent
Oil	17	30%	8	14%
Propane	16	29%	6	11%
Natural gas	15	27%	1	2%
Oil/propane	3	5%	0	0%
Oil/natural gas	2	4%	0	0%
Wood	1	2%	4	7%
Kerosene	1	2%	0	0%
Bio-fuel	1	2%	0	0%
Electric	0	0%	1	2%
Natural gas/propane	0	0%	1	2%
Fuel oil/wood	0	0%	1	2%
No Answer	0	0%	34	61%
<b>Total</b>	<b>56</b>	<b>100%</b>	<b>56</b>	<b>100%</b>

## Energy Saving Technologies

In a 2003 survey of New Jersey greenhouses, 61% of the respondents were considering energy saving technologies. In the 2008 survey, 45% of the respondents had implemented energy saving technologies since 2003 and 39% are considering implementing energy saving technologies (Table 2). Energy curtains (11%), lower temperature (9%), bottom heat (7%), and closing down a portion of the year (7%) were the most common energy saving technologies that have been implemented. Wood boilers (5%), new coverings (5%), growing in less space (5%), new heater (5%), tighten everything (4%), new wall material (2%), new equipment (2%), environmental computer (2%), changing to hard plant crops (2%), new thermostats (2%), and fan/pad cooling (2%), were energy saving technologies that some growers have adopted since 2003. Solar (14%) and wind (13%) were the most frequent energy saving technologies respondents are considering. Nine percent of respondents were not sure what energy saving technologies to adopt, but were considering all options. Energy curtains (7%), wood burning furnaces (7%), more efficient heaters/boilers (4%), alternative heat source (2%), plastic wall (2%), geothermal (2%), and fuel pre-heaters (2%) are other energy saving technologies being considered.

**Table 2.** Number of growers who were considering implementing energy saving technologies 2003, and number implemented energy saving technologies or were considering implementing them in 2008.

Response	2003		2008			
	Considering		Implemented since 2003		Considering	
	Number	Percentage	Number	Percentage	Number	Percentage
Yes	70	61%	25	45%	22	39%
No	33	29%	28	50%	14	25%
No Response	11	10%	3	5%	20	36%
Total	114	100%	56	100%	56	100%

### Alternative Energy Sources

In 2003, 17% of the respondents were considering alternative energy sources. In our 2008 survey, only 2 respondents (4%) were using alternative energy. Both of these respondents were using wood burning furnaces. Forty-five percent of the respondents in 2008 were considering alternative energy sources. The alternative energy sources being considered were wind (23%), solar (20%), wood (7%), anything (5%), biomass (4%), electric (2%), corn (2%), geothermal (2%), and double energy curtains (2%).

### Co-generation Consideration

In 2003, 10% of the respondents were considering co-generation. In the 2008 survey, 4% of the respondents were using co-generation, and 9% were considering co-generation.

### Fuel Surcharges

Eighty-four percent of the respondents indicated that their vendors were charging a fuel surcharge. Twenty-three percent of respondents had asked their vendors to waive the fuel surcharge, and 13% have switched vendors because of fuel surcharges. Twenty-three percent of respondents were charging their customers a fuel surcharge. Thirteen percent of respondents had customers who have asked them to waive the fuel surcharge, and 25% would consider waiving the fuel surcharges in the future. Nine percent of respondents feel they have lost customers from charging a fuel surcharge, and 66% think fuel surcharges are bad for business.

### Bio-fuels

Thirty-nine percent of the respondents would consider growing bio-fuels. Respondents who indicated how much land they had available for growing bio-fuels had an average of 59 acres which could be devoted to growing bio-fuels, and would be willing to devote an average of 50 acres to growing bio-fuels.

Most respondents did not indicate where they get their information in making decisions about energy conservation and alternative energy.

## **Summary**

Our survey of NJ greenhouse growers showed that while only 4% have adopted alternative energy, 45% of them are investigating new methods of energy use, storage, and generation. Some of the alternative energy uses include biomass (wood, corn, switch grass, etc.), co-firing (coal and biomass), solar, wind, electric, geothermal, and double energy curtains.

Most greenhouses are seasonal businesses with maximum production in the spring. Adding energy production to their business will help spread their overhead costs over more of the year as well as extend employment opportunities.

Survey respondents do not feel that fuel surcharges are the answer in dealing with increasing fuel costs, and nine percent of respondents feel they have lost customers from charging a fuel surcharge. Sixty-six percent think fuel surcharges are bad for business. While eighty-four percent of the respondents indicated that their vendors were charging a fuel surcharge, twenty-three percent of respondents had asked their vendors to waive the fuel surcharge, and 13% have switched vendors because of fuel surcharges. Only twenty-three percent of respondents were charging their customers a fuel surcharge, thirteen percent had customers who have asked them to waive the fuel surcharge, and 25% would consider waiving fuel surcharges in the future.

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