

Crushing cool pockets

Molenaar Greenhouses was losing money, and plants, with an inferior heating system. That's when the company decided to revamp its facility. By Rachel Vastyan



Gerardus (Jerry) Molenaar recalls in his youth working in the windmill-spotted fields of the Netherlands with his 11 siblings. During the winter months, the Molenaar family grew acres of cauliflower and cabbage and in the summer they tended to gerbera daisy fields.

When he was in his early 20s, Jerry jumped at his first opportunity for a United States work visa. From October 1972 to April 1973, he spent his time in New Jersey growing Easter flowers for the Geerlings Greenhouse company. Toward the end of his stay there, he asked the owners if he could continue on with his work for them.

After an enthusiastic “Yes!” from his employers, Molenaar remained with Geerlings until 1978 when he decided it was time to work for himself.

A few decades later, Molenaar finds himself at the helm of a successful family-run commercial greenhouse operation in southeastern Pennsylvania, growing a wide variety of flora.

Re-greening

The Molenaar operation, based in Ivyland, Pa., includes 23 greenhouses — more than 100,000 square feet under plastic — on a 13-acre lot, surrounded by fields and historic barns and outbuildings.

Up until 2012, the greenhouses were equipped with several old 250,000 BTU, upright unit heaters running at operational efficiencies between 50 and 60 percent. The two largest greenhouses had units that ran on natural gas, but because propane was so much cheaper at the time, the remaining 22 greenhouse units were propane.

Molenaar Greenhouses in southeastern Pennsylvania.

Case Study

“Our monthly heating bill was \$8,000 or more during the winter,” Mario Murillo, Molenaar’s plant manager, and Jerry’s son-in-law, says. “[Having] that many unit heaters at 250,000 BTUs each running constantly in the winter ... was ridiculously expensive. We went through 1,000 to 2,000 gallons of propane a week. We were also in constant fear that there would be a propane shortage and we wouldn’t get our weekly delivery, which could be devastating.”

To make matters worse, when the heaters were firing at full capacity during the winter months, the greenhouses barely rose above 55 degrees Fahrenheit. And there were also very troublesome cold pockets, mostly found immediately behind the heaters. It was the physical mass of heaters that prevented those spaces from receiving warmth that circulated in convection cycles within the greenhouse. Behind the heater, it was cold.

According to Murillo, each greenhouse had several of these areas that they simply couldn’t heat. “We tried on occasion to change the circulation of air in the greenhouses, or to alter the heating recipe, but it just wouldn’t work. The plants were suffering and it was having a bad impact on our operations.”

“In the coldest weather, the old space heaters simply couldn’t keep up with the demand for heat,” Molenaar says. “We had a problem that we couldn’t fix with the existing equipment and it was cutting into our ability to be profitable.”

The likelihood of gas rationing and the falling efficiency of the old space heaters were Molenaar’s call-to-action. The greenhouses needed heating systems that could meet the growing challenge of keeping the houses operational through the winter months.

It’s all in the (efficiency) numbers

Molenaar turned to his son-in-law, who is adept at handling mechanical challenges and has an intuitive knack for greenhouse operations.

Murillo spent weeks researching his options. Ultimately, he chose to install Modine Effinity natural gas condensing unit heaters. Operating at up to 97 percent energy efficiency, the stainless steel unit heaters



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“ We had a problem that we couldn't fix with existing equipment and it was cutting into our ability to be profitable.”
–Mario Murillo

can also withstand the high humidity that comes with the greenhouse environment — a challenge for other systems.

“We knew we had to make the move from liquefied petroleum (LP) to natural gas. Twenty years ago when the old heaters were installed, natural gas was much more expensive than propane, which is why only two of the greenhouses were natural gas,” Murillo says. “But this was our opportunity to save on fuel, to invest in new heating systems and to greatly improve our ability to sufficiently heat the greenhouses. There were no downsides to the decision.”

As condensing units, in the heating mode, the systems are designed to extract BTUs from the exhaust gases within the stainless steel heat exchangers, leaving slightly acidic condensate behind. The condensate is channeled away and disposed of either through floor drains or outside the greenhouses. Built to tolerate temperature and humidity swings, these unit heaters are a fit for greenhouse applications.

Because the investment of new unit heaters would reach \$60,000, Molenaar chose to split the order in two. The first order for 19 new unit heaters was placed in November 2012. Murillo and maintenance technician, Damian Luna, installed the Effinitys in the largest greenhouses.

In December 2014, the second batch of unit heaters arrived, and by February of 2015, the remaining 18 systems had been installed. Molenaar's 23 greenhouses were being heated evenly, effectively, and completely — meaning no more cold pockets.

Murillo and Maintenance Technician Damian Luna installed the first set of new unit heaters at the Molenaar operation in 2012.





Left to right: Mario Murillo, Wendie Murillo, Jerry Molenaar

The new systems have also rescued Molenaar Greenhouses from the biggest challenge of all — the cost of heating the spaces all winter long.

“These new heaters will save us thousands of dollars a month because they’re so efficient,” Murillo says. “Having all units running on natural gas straight from the grid is much more affordable — especially since this year’s propane prices have skyrocketed to \$5 a gallon. It’s scary to think we could have been paying that much money.”

Versatility

Having air circulation in greenhouses is incredibly important. If too much moisture is in the air, harmful fungus will grow and can be devastating to the flowers and other plants. So in the warmer months when the unit heaters aren’t being used for heating purposes, they’re used for air circulation.

“The new heaters can keep up with the greenhouse demands, no matter how low or high the temperatures are outside,” says Molenaar. “The plants are flourishing like they never have before.” **GM**

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THREE GENERATIONS OF GROWERS

Today, Jerry’s daughter, Wendie Murillo, and her husband Mario are part of the Molenaar team. Wendie is the greenhouse and office manager and Mario is the physical plant manager.

“Our client base consists mostly of landscapers,” explains Molenaar. “So we grow whatever they need: begonias, geraniums, dusty millers — you name it. The plants are typically used for landscape beds and decorative pots or planters, so we mostly grow annuals, with the occasional perennial or decorative cabbage mixed in.”

While many greenhouse operations today are completely automated, Molenaar prefers a more labor-intensive route. He says that the hands-on approach guarantees that plants never get over- or under-watered or fertilized.

“We pick up the plants and look at them ourselves and say, ‘this table of begonias could use more fertilizer, or these succulents are being over-watered,’” Wendie Murillo says. “An automated system typically waters and fertilizes all plants the same, even when they may not need it. It can’t look up at the sky and see that it’s cloudy, meaning that the plants may not need watered that day.”

“The automated systems also don’t take into account that in the summer we have the houses open — and if it’s especially sunny and windy — the plants dry out faster and in turn need to be watered more regularly,” she adds.

There are now three generations at Molenaar Greenhouses. Mario and Wendie have three boys, ranging from one to 10 years old. The older two help out in the greenhouse on weekends and snow days.

Wendie can remember the same thing when she was a child growing up in a greenhouse: “My father always motivated me and made the work fun, even if it wasn’t the first thing I wanted to do. Mario and I do the same for our boys these days. Working with your family is the best thing in the world and we’re hoping to continue this with more generations to come.”

What started off as a family chore in the fields of the Netherlands evolved into a love for the work, a way of life and an expanding Molenaar enterprise.