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Somerston Wine Co.'s High-Tech, Sustainable Winery

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The Somerston Ranch includes two valleys, 200 acres of vineyards and 1,500 sheep. Photo: Andrea Johnson

SOMERSTON

Wine Co.'s High-Tech, Low-Impact Winery

St. Helena producer combines groundbreaking technology and sustainability

By Tina Caputo, editor-in-chief

"High tech" is not the first descriptor that comes to mind when arriving at the Somerston Wine Co. estate, high in the eastern mountains of Napa Valley. The 1,628-acre ranch – with its hills, valleys and resident flock of sheep – is more often described with words like "bucolic, "beautiful" and "remote."

Rather than calling attention to itself with "look-at-me" opulence, the winery facility – a converted agricultural building left over from the property's former incarnation as a cattle ranch – blends into the landscape, allowing the estate's natural beauty to take center stage.

Look closer, however, and you'll discover that Somerston includes a remarkable high-tech feature that no other winery can claim: the first-ever integrated CO2 heating and cooling system.

This system is the cornerstone of Somerston's energy-efficient facility, which was completed in April 2011 after a two-year construction process. In less than 18 months, the facility will expand to include an additional structure equipped with solar panels that will take the winery completely off the power grid.

Although the facility officially opened less than six months ago, Somerston produced its 2010 wines there through a temporary occupancy permit. (Prior to that, the wines were made at Hall Winery in St. Helena.) This year will mark the producer's first fully functional crush at the 12,000-square-foot facility.

According to co-owner, general manager and winemaker Craig Becker, who founded Somerston Wine Co. in 2008 with Allan Chapman, the idea behind the new facility was not only to build efficiently, but to operate efficiently.

"Every element of the Somerston winery has a purpose," Becker said. "We have a really amazing property – it's almost like a national park. So for us, the winery is just a winemaking facility – period. There's nothing fancy, but we have all the equipment you could ever imagine in terms of winemaking."

WINERY 'FIRSTS'

The winery's integrated CO2 refrigerant heating and cooling system is comprised of four elements: a CO2 refrigerant heat pump; a hybrid adiabatic fluid cooler that replaces the traditional cooling tower; a glycol warming system for tank and barrel room heating; and a high-efficiency glycol chiller for additional tank and barrel room cooling. The components represent technology used only by a handful of companies in the world, and Somerston is the first to integrate the components into a complete system.

The CO2 heat pump system operates with zero emissions of hazardous refrigerants while achieving a vastly higher coefficient of performance compared to traditional propane-based hot water boilers and standard refrigerant heat pumps. Where a standard propane-based hot water boiler is about 80% efficient, Somerston's CO2 heat pump is 300%-400% efficient while performing heating and cooling functions at the same time. While standard winery refrigerant heat pumps achieve 160°F hot water temperatures, Somerston's CO2 refrigerant heat pump can achieve 194°F. Other industries have been using this technology for years – including dairies, breweries, food processors and hotels – but Somerston is the first winery to adopt it.

The Mayekawa Eco Cute heat pump uses CO2 to simultaneously cool glycol and heat hot water. Photo: Craig Lee

The system's first component, a Mayekawa Eco Cute electric-driven hot water heat pump, uses CO2 as a refrigerant for glycol cooling and hot water heating all in the same unit. Its ability to heat and cool simultaneously makes it more efficient than a standard hot water boiler, and because of its closed cycle, there are zero hazardous emissions. By using CO2 instead of freon refrigerants, Somerston's system results in a lower carbon footprint and dramatically lower ozone depletion. The CO2 refrigerant heat pump, proved effective in Japan and Europe, made its U.S. debut at the Somerston winery.

The second component is a hybrid adiabatic fluid cooler. While traditional winery cooling towers require large amounts of water and can be costly to maintain, Somerston's fluid cooler acts as an air cooler during temperate months and a wet cooler during hotter months. Somerston is the first winery in the U.S. to utilize this technology.

The high-efficiency glycol chiller and glycol warmer, custom-built by NovusTherm Corp. in Yountville, Calif., is the final component of the system and is used for tank and barrel room cooling. It uses the CO2 heat pump as an integrated component to indirectly warm glycol with a special safety plate heat exchanger and directly cool glycol, resulting in dramatically lower energy requirements than traditional systems.

The winery also features one of the first anaerobic process waste bio-filters in Napa County, designed by DJH Engineering in Placerville, Calif., which ferments out 95% of biological matter and delivers clean, pH-adjusted processed water that's slightly high in potassium. It is then mixed with the irrigation water for Somerston's vineyards.

"The bio-filter consumes very little energy and very low solids are produced because it's anaerobic fermentation," Becker said. "With that, we have a very efficient, easy-to-maintain system. The hardest part is probably getting a biological mass big enough to really do the job, which just takes time."

CAREFUL INVESTING

In building the new winery, Becker said, one of his primary goals was to stay within the project's budget. "We wanted to actually build something we knew we could project the cost of," he said. The whole project, including the road and excavation, came in at just under $9 million. "We had a few overages, but we've stuck pretty closely to the budget."

Rather than spending money on high-profile "green" stamps of approval – such as the Leadership in Energy and Environmental Design, or LEED, certification – Becker chose to invest in energy-efficient equipment. "We asked ourselves, 'If we take a cost of about $100,000 – that's about what it costs to get LEED certified – can we put that money to use toward products that will actually help us operate with a smaller footprint over a longer period of time?' That's what we chose to do."

In designing Somerston's CO2 heating and cooling system, Becker worked with Troy W. Davis, CEO of NovusTherm. In addition to designing and installing Somerston's system, NovusTherm supplied the CO2 heat pump and hybrid fluid cooler.

"I knew they were looking for alternative equipment and didn't want to use propane for heating hot water, since they don't have a natural gas source at this winery," Davis explained. "They want to go net zero in the future with solar PV (photovolactic), so having an electric unit that can heat water to high temperatures and not using a polluting boiler were key factors."

"Wineries use a ton of hot water," Becker added, "and you have to sanitize. So the CO2 heat pump acts as stage one in our cooling system – we've got a 12-ton chiller – and this acts as our primary functioning cooling system for the winery. The heat pump part circulates CO2 throughout the rest of the system, capturing heat, bringing it back through a heat exchanger and heating a 5,000-gallon tank of water to 295°F. That's all done on electricity – so when we're on solar we'll be able to be completely off the grid."

Somerston's solar-equipped second building, set to be completed by late 2012 or early 2013, will house production, barrel storage, tanks, offices and possibly a bottling line.

Somerston's owners opted to invest in technology to improve the winery's energy efficiency, instead of spending money on aesthetics or LEED certification. Photo: Tina Caputo

The facility currently produces 16,000 cases per year across Somerston's three brands – Highflyer, Priest Ranch and Somerston Wines – and its custom-crush clients. Becker projects that production will reach 20,000-25,000 cases for Somerston Wine Co.'s brands, depending on cash flow and profitability. "Our production is approved for 60,000 cases, so we built everything to that size," Becker said. "That includes our refrigeration system, our CO2 pump and our hot water system."

In terms of cost, Davis said it's not easy to make direct comparisons between Somerston's setup and traditional systems. "For example, one of the heat pumps is typically five times the cost of a comparable gas fired boiler," he said. "However, a boiler does not also cool glycol while it is heating water. When factoring in electricity costs versus propane costs, and also the energy efficiency of combining the hot water heating and cold glycol cooling into one cycle with one electric input, the savings are very good.

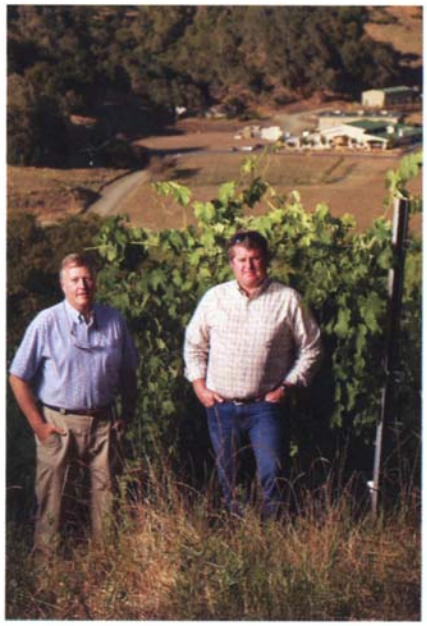
"We have real and accurate cost analysis of systems for wineries where an existing hot water and chilled glycol system exists. Even with a $150,000-$380,000 capital cost, there is a two-and-a-half to four-year payback period (for the CO2 system), which is about half that of solar PV systems. These hybrid systems can have real and positive ROIs (returns on investment), and they're good for existing wineries as well as new ones."

Since installing Somerston's system, Davis has received inquiries about it from wineries in California, Oregon and Washington.

BEYOND THE FACILITY

Despite Somerston's innovative high-tech features, Becker sees the estate itself as the winery's greatest advantage.

Allan Chapman purchased the historic 638-acre Priest Ranch in 2004. The following year, he acquired the 990-acre Elder Valley (also known as Lynch Vineyards) in the mountains east of Rutherford near the Chiles Valley appellation, to create one contiguous property called the Somerston Ranch.



Allan Chapman (left) and Craig Becker are partners in Somerston Wine Co. Photo: Craig Lee

Chapman's ancestors were involved in shipping tea from India to England, and the name "Somerston" was inspired by George Somers – no relation to Chapman – who was a major figure in the British shipping business. (In homage to Chapman's family roots, many of Somerston's estate vineyard blocks are named after ships and tea clippers.)

Somerston includes more than 200 acres of sustainably farmed vineyards, planted at elevations ranging from 800 feet to 1,200 feet. In addition to more than 15 grape varieties, the property includes 1,500 sheep, fruit and olive trees, vegetable gardens, bee hives and natural springs.

It has long been a grape source for renowned Napa Valley producers and wineries, such as David Ramey, Heidi Barrett, Caymus Vineyards, Orin Swift Cellars, Pahlmeyer and Viader.

Becker first encountered the property in 2005, while seeking out grapes for a consulting project. Becker and Chapman got to know each other, and together they decided to create a wine program that would promote Somerston as a world-class estate. They began producing wines from the property in 2006.

To further convey a "sense of place" to wine drinkers, Somer-

Dorper sheep graze the ranch to keep invasive plants and weeds at bay. The flock is tended by a sheep expert from Peru. Photo: Tina Caputo

ston opened a tasting room on the estate in June 2011. In addition to tasting wine, visitors can tour the property in a four-wheel-drive buggy, take a guided educational hike through the vineyards or join a cycling tour. Food and wine pairings feature Somerston Wines (the Highflyer and Priest Ranch wines are poured at the winery's Yountville tasting room) with local cheeses, estate-grown produce and lamb appetizers made from the property's resident sheep.

MINIMAL WINEMAKER IMPACT

In keeping with the company's "estate-first" philosophy, Becker strives to produce wines with minimal winemaker impact. "There's technology surrounding us – all around this building – but we use native yeast, native ML, and the wines are mostly unfiltered," said Becker, who was formerly the head winemaker at Spring Mountain Vineyard. "The 'intervention' is in racking, using egg whites and SO2. It's pretty straightforward. There are times when we have to get in and intervene with all those high-tech toys because things do go wrong, but wine should be made in the vineyard. That's a cliché, obviously, but it's true.

"As in cooking, we want people to taste great ingredients, not my 92% new French oak and my 16 different strains of yeast," Becker said. "It's a matter of really trying to bring that sense of place to the wines."

Somerston Wine Co.'s brands include Somerston Wines, Priest Ranch and Highflyer.

Somerston Wine Co.'s brands include Somerston Wines, Priest Ranch and Highflyer, each with its own focus. The Somerston Wines brand represents the company's high-end estate wines, including a single-vineyard cabernet sauvignon ($120), a red Bordeaux blend ($90) and a sauvignon blanc ($40). Annual production is currently around 1,500 cases.

Also made from estate fruit, Priest Ranch includes cabernet sauvignon ($38), petite sirah ($38), zinfandel ($28) and sauvignon blanc ($24). Annual production is 5,000 cases.

Highflyer wines include an eclectic lineup of varieties from vineyards throughout California, including some of Somerston's own grapes: viognier ($17), grenache blanc ($17), pinot noir ($38), syrah ($48) and a red blend called Centerline ($28).

The Somerston Wines and Priest Ranch wines all carry a Napa Valley AVA, while Highflyer wines carry AVAs from various California regions. The wines are sold through a distributor, as well as through direct sales. ■

Comments? Please e-mail us at feedback@vwm-online.com.

SOMERSTON WINE CO.

- **Founded:** Allan Chapman and Craig Becker officially founded Somerston Wine Co. in 2008, but they began producing the Highflyer and Priest Ranch wines in 2006.
- **Location:** St. Helena, Calif.
- **Principals:** Craig Becker, co-owner/general manager/winemaker; Allan Chapman, proprietor; Ignacio Gallegos Jr., vineyard manager.
- **Vineyards:** Approximately 200 acres.
- **Main Varieties:** Cabernet sauvignon (77 acres), merlot (26 acres) and syrah (26 acres), with smaller amounts of several others.
- **Production:** 14,500 cases total, including Highflyer (8,000 cases), Priest Ranch (5,000 cases) and Somerston Wines (1,500 cases).
- **Winery Design:** Valley Architects, St. Helena, Calif.; construction was handled in-house.