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## interviews

# Vineyards and wineries embrace renewables, energy efficiency to best climate change

Tuesday, 25 October 2011

Dan McCue

Say what you will about climate change – and even at this late date, divergent opinions abound – for those whose livelihood is rooted in the ground and for whom terror is everything, the debate ended a long time ago.



In 2009, after years of private discussions and ruminations over the effects of global warming, leading figures from the French wine and food industries banded together to urge their government to push for a strong global agreement on greenhouse gas reductions at the then-pending UN climate summit in Copenhagen.

“The jewels of our cultural heritage, French wines, elegant and refined, are today in danger,” a group of more than 50 winemakers, sommeliers and chefs wrote in an op-ed published in *Le Monde*.

The piece, written as an open letter to French President Nicolas Sarkozy in collaboration with Greenpeace, warned that “changes in the climate are leaving our vineyards increasingly vulnerable. Summer heat waves, recent hail storms in the Bordeaux region, new disease coming from the south – these disturbances will soon be much more serious.”

If anything, in the years since, the climatological roller coaster has become even more of a cause for concern, and the challenges are being felt in the old world and new, and in both the northern and southern hemispheres.

In Europe, an exceptionally warm and dry spring led to the anticipation of equally exceptional early harvest. That is until cool, damp weather arrived in late summer, bringing with it the threat of widespread fungal diseases for scores of vineyards in northern Europe.

In the meantime, growers in southern Europe continued to experience an unusually hot summer.

A world away, many vineyards in the US state of California struggled with unseasonably cool temperatures for much of the 2011 growing season, while in Australia the annual harvest coincided with some of the heaviest rains of the year.

In June, the Spanish Wine Federation held the first-ever “Wineries For Climate Protection” conference in Barcelona. The event, which was undertaken in collaboration with the Wine and Nutrition Research Foundation, the Foundation for the Protection of Vineyards, the Environment and Consumers, and Alimentaria, the International Food and Drinks Exhibition, was attended by representatives of more than 300 vineyards.

The gathering laid out the challenge before them thusly: Vines are extremely temperature-sensitive and the quality of wines can be affected when temperatures rise. Already, the group said, temperatures around the globe have increased by 1 degree over the last 40 years, and forecasts for the rest of the 21st Century suggest an additional rise of anywhere between 2 degrees and 5 degrees.

“To arrest that change, means taking the lead in changing the use of energy, reducing petrol consumption and progressively bringing in renewable or biomass energies,” the group said.

Several wineries around the world are already applying this type of solution, while others are rapidly moving in this direction.

### Thinking, acting regionally

In Champagne, an appellation in France located about 90 miles northeast of Paris, growers and champagne houses

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have taken a holistic, region-wide approach to addressing climate change.

"In a sense, this is just a continuation of how Champagne has always functioned," said Sam Heitner, director of the US office of the Champagne Bureau.

"The growers and houses have been working together on issues – not just carbon issues – since 1911," Heitner said.

The Champagne Bureau is comprised of 15,000 growers and 350 Champagne houses, and every organizational committee has two presidents, representing the two entities that are responsible for the production of the world's premiere sparkling wine from some 35,000 hectares.

"Because of the way they are set up, they are able to create community based systems," Heitner said. "When it comes to carbon emissions and climate change, that ability has led to some community-wide decisions that are pretty impressive."

In 2002/2003, the growers and Houses of Champagne did a community-wide audit to create a true-to-life picture of exactly what their carbon footprint was as a region.

Not only did the audit include grape growers and Champagne-making operations, it also looked at everything from the emissions associated with the bottle-making process to the packaging and shipping of an average 340 million bottles of Champagne a year, to the source and use of office supplies in Heitner's office, which is located in Washington, D.C.

"Once they had a sense of where they actually stood, they came to an agreement that by 2025 they would reduce that carbon footprint by 25 percent, and that by 2050, they would reduce it by 75 percent," Heitner said.

In all, the organization imposed some 40 different programs intended to meet those goals.

"Everybody was given a plan explaining how to cut their carbon footprint, and these ranged from the creation of a lighter bottle to changing how we traveled between locations," Heitner explained, pointing out how even the seemingly smallest change could have a big, and multi-faceted impact.

"For instance, in the case of the bottle, a project undertaken with our glassmakers, if you or I were to look at a bottle produced today and one produced before this effort got under way, we would barely notice the difference, and yet a lot of thought went into that one single initiative," he said.

While most people scarcely notice the bottle their favorite alcoholic beverage comes in, you can't make major changes to the champagne bottle because it has sparkling wine inside it and therefore needs to be able to withstand six G's of pressure.

Meeting this exacting standard is critical to the safe transport and storage of the product.

Yet Champagne's glassmakers were able to come up with a workable solution, shaving a little less than two millimeters off the shoulder of the bottle.

"That one solution has had a significant impact on reducing the region's carbon footprint, and it has done so in a number of ways," Heitner said. "It takes less glass, power and emissions to produce the bottle, and it also enables us to put another entire pallet of bottles in the container that goes on the ship, reducing our carbon footprint in that way as well."

"Small changes that you cannot see with the eye have massive implications," he adds.

Another example Heitner noted was his own travel between the US and Champagne.

In days past, he would fly into Paris' Charles De Gaulle Airport and more likely than not, take a car to Champagne. Now, he's required to take a train.

"Even though administration, which is the category my activities fall under, amounted to only 4 percent of the carbon emissions for the entire community, everyone is expected to do their part in every way they can," Heitner said.

Change is also coming to the agricultural side of Champagne, albeit at a slower pace.

"Changing the bottle took a year and a half – after years of discussion," Heitner said. "Changing viticultural practices takes a little longer.

One thing that has already happened is growers have begun to recycle their prunings and turn them into electricity.

"In the old days, they would prune the vines and then they would just burn the material," Heitner said. "Now, they combine all of their prunings and take them to the local power plant where the prunings are turned into a biogas that is then used to make electricity."

"In this way we're curtailing the emission of smoke into the air, and reusing 98 percent of our clippings to produce the electricity we use," he said.

"Again, none of these initiatives are the kind of things a tourist would notice when they visited our region, but we're doing everything we can: We're cutting down on waste, cutting down on transportation, reusing wastewater for different purposes... and at the same time, we are also ensuring that the quality of our vineyard practices are maintained.

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"We're not changing the central ways that we do things, we are just doing them in a more energy-efficient, more carbon efficient manner," Heitner added.

Later, Heitner reflected on the impetus for all this activity.

"Is climate change *the* reason that we are doing all this? No, there are economic benefits to these initiatives as well. Is it one of the reasons? Certainly," he said.

"Obviously, at the end of the day, wine is a farm product. As such, we have a great connection to the land and we understand that the land has changed and the climate has changed and it is having all these impacts.

"We also understand how big the world is because we ship wine all over the world, and the combination of these things came together along with the European Union requirements associated with the Kyoto Treaty," Heitner continued. "That led to the belief that we should be better stewards of our domain, and to the recognition that if we didn't, we couldn't ask others to be better stewards of theirs.

"I like to say that Champagne has always walked the walk," he said. "As farmers, we feel we must do everything we can to protect our unique location in the world. After all, Champagne only comes from these hectares."

### **Integrating renewable into vineyard operations**

Steve Lohr, executive vice president and chief operating officer of J. Lohr Vineyards and Wines in the US was a student at Stanford University when he fell under the spell of James I. Leckie, a professor who was very much into renewables and sustainability.

"In fact, he wrote a textbook called "Other Homes and Garbage" outlining many of his ideas," Lohr said, still chuckling over the title all these years later.

"Obviously, photovoltaics – this was back in the early 1980s – were not that commonly used, but they were around and he talked a lot about passive solar design, and designing homes and buildings and such that way. And he also talked a lot about recycling and those kinds of things and that really got me interested in this whole area," he recalled.

Lohr would graduate with degrees in both civil engineering and economics, and he joined his father Jerry – the "J" in "J. Lohr" – in the custom home building business.

"As civil engineers, we both had an interest in buildings and structure and making them more energy efficient, but in terms of renewables, in many cases, the economics just weren't right for them to be implemented on a very large scale," Lohr said.

In fact, it wasn't until two decades later, by which time the Lohrs had gone from building builders and designers to vineyard owners and winemakers that they begin to think seriously about how to integrate renewable energy into their work.

"It was the early-to-mid 2000's, and we thought, 'Here we are with one of our two wineries being in Paso Robles, and we've got two realities here, one we can harness and one we need to deal with,'" Lohr said.

He goes on to explain that Paso Robles is on the central coast of California, halfway between San Francisco and Los Angeles.

"It's a beautiful area, about 25 miles from the ocean, and it's quite warm and very sunny. We actually get about 320 days of sun per year, and during the summer it's not unusual for it to be 100-to-105 degrees here," he said.

"So we're blessed with a huge amount of solar energy and a very big need for energy to cool the barrels and keep the fermentation tanks cool, and what we concluded was that it was just natural for us to go ahead and jump into solar," Lohr said.

In Paso Robles, J. Lohr grows all five Bordeaux varietals: Cabernet Sauvignon, Merlot, Petit Verdot, Malbec and Cabanne. They also grow Rhine varietals such as Syrah, Grenache and Mourvedre, and varietals that are neither Bordeaux nor Rhone, like Petit Syrah and Zinfandel.

The family also owns a "cool climate" vineyard up the California coast in Monterey County, where it grows Chardonnay, Riesling, Pinot Noir and what Steve Lohr describes as "a very rare French varietal" called Valdigue.

To bring its desire to integrate solar power into its operations to fruition, the vineyard partnered with Conergy, a designer and manufacturer of photovoltaic systems.

Together they collaborated in installing a state-of-the-art 756 KW single-axis solar tracking system designed to offset 75 percent of the winery's energy usage. The ground-mounted solar array spans three of the vineyard's 2,000 acres and is anticipated to save the vineyard about \$216,000 annually in its utility costs.

On the downside, the three acres dedicated to the array were occupied by longstanding Merlot grape vines the day installation got underway.

"Unfortunately, the way grape vines grow, once they get to a certain point, they cannot be transplanted, so we lost those," Lohr said. "Despite that, it was a relatively easy decision [to make that sacrifice].

"The decision actually grew out of an energy efficiency workshop that was being held at our winery for the greater

wine community in Paso Robles," he said. "PG&E, the local utility, presented it, and at that meeting they hooked us up with someone who could come in and take a closer look at our energy consumption, our peak usage time and so on, and what it might generally cost to do solar.

"The other thing that helped was all of the various incentives that were available at the time from the state of California and the federal government," he said, adding with a chuckle, "Now let me clarify, it was an easy decision to go with solar energy; but at the same time, those were three very good acres of Merlot."

"But you know, if you're going to transmit energy, you have to be as close to the source as possible in order for it to be efficient. And the three acres of Merlot were the closest spot to where we needed the power."

The solar array feeds directly into J. Lohr's wine-making operation and also powers the winery tasting area, known as the wine counter.

The vineyard and winery has also undertaken a number of energy efficiency initiatives.

"As part of our whole sustainability movement over the last several years, we've completely changed out our lighting to get more energy efficient, we have motion sensors on all of our overhead lights so that when a worker walks by a tank or barrel, a light turns on, and when that person leaves, the light turns off. That's a low-hanging fruit kind of initiative," Lohr said.

"In the vineyard itself, we've tried to be more energy efficient with our pumps, switching to variable sequencing drive pumps, that give us better control of the amount of water we use," he continued. "We also use sequencing drives that enable us to cool only those tanks that need to be cooled.

"Now, variable sequencing drives are one of the things that isn't very sexy – they're not like a big, tracking solar array or something else that you can point to and gets a lot of attention, but over a period of months and years, they are a big difference maker," he said.

Lohr described himself as a believer in climate change and described his relationship with it has a state of wariness.

"That's part of the reason we jumped so heavily into doing the solar tracking array," he said. "We have seen more variability in our weather patterns just in the last five years than we have over the last 25 years. And there are all kinds of studies going on showing that if the world warms 1.2 to 2 degrees centigrade that could put some well known wine growing regions in California essentially out of business because the grapes that have made the reputations of those areas will no longer be able to survive."

To try to prevent that, Lohr and scores of his colleagues are active members in an organization called the California Sustainable Wine Growing Alliance, a public policy organization put together by Wine Institute, with funding from the California Association of Wine Grape Growers.

Lohr, in fact, is the alliance's director. In 2002, the alliance began hosting a series of self-assessment seminars and distributing self-assessment workbooks.

"The book itself is several hundred pages long and includes 227 different criteria that involve viticulture, soil management, wine quality, energy efficiency and a host of other topics relevant to a sustainable vineyard operation," Lohr said.

"As you go through the workbooks, 14 chapters, you rate yourself on a scale of one to four, with one being a standard business practice and a four denoting a practice that's very sustainable," he continued. "The real beauty of the self-assessment is that you can then turn this information into an action plan that lays out a course on how you can improve your sustainability. The workbook itself describes the process of getting from one level of the scale to the next."

Since 2002, 68 percent of the 525,000 acres of wine grapes grown in California has been assessed and about 65 percent of the 240 million cases of wine that are produced in the state each year have also been assessed through their wineries.

As for J. Lohr, the vineyard and winery is already considering a second renewable energy project; this one at its vineyard at Monterey County.

"We are in the very early stages of looking at the potential of deploying some wind turbines," Lohr said. "We're considering putting a turbine or two up there."

The vineyards, located in Greenfield, California, are part of the Arroyo Seco appellation and are exposed to what Lohr described as "pretty serious" afternoon winds that "come screaming down the Salinas Valley."

"We don't have a huge energy need there at this time because we don't yet have a winery in the area, but we think maybe, just for overall pumping costs, wind might be a viable option to consider," he said.

Lohr said a decision on wind power at its Monterey County vineyard will likely be made some time next year.

### **Momentum grows**

Of course, J. Lohr Vineyards and Wines isn't the only wine operation in California to embrace solar power, nor is it even the only vineyard in Monterey County to delve into renewables.

Estancia winery's original Monterey County vineyard was established in 1961, and it has specialized in growing Chardonnay and Pinot Noir in the Monterey Appellation since 1986.

In 2010, the Estancia winery – as part of a larger renewables initiative embarked upon by its parent company by Constellation Wines US -- installed over 4,000 solar panels at its facility, an array that has reduced the operation's carbon footprint by an estimated \$1.5 million pounds of greenhouse gases.

"We want the quality of our wines to match the quality of our environmental citizenship," said Scott Kelley, director of winemaking and general manager at Estancia's 2,000-plus acre winery. "And we see sustainability as something akin to a three-legged stool – we want to do right by the land, we want to leave conditions better than we found them, and we want to do what's right for the business."

He added, "All of our employees take pride in ensuring that we are not leaving anything behind that affects the future of our families".

The 18-month-old solar system supplies about 75 percent of the winery's energy needs.

In addition, the winery now uses only locally-produced bio-diesel in its tractors and it has instituted a number of energy efficiency measures.

"For instance," Kelley said, "We retrofitted all of the lighting in our production facility by replacing HID fixtures to T8 Fluorescent fixtures with motion sensors. Then, to further, reduce energy usage at the winery, undertook what we called our Glycol Refrigeration Project, in which we replaced air cooled reciprocating compressors in our refrigeration units with screw compressors and a cooling tower with a variable frequency drive."

"We also monitor all water usage in all production areas," he continued. "All winery waste water is transferred to our internal water treatment ponds, which is then released to percolation fields in the vineyard."

"We also initiated an in-house energy audit to assess our current practices and engage in more energy efficient methods," he added.

Taking sustainability a step further, the winery also initiated a number of employee-culture program, Kelley said.

In addition to a company-wide recycling program, all disposable flatware used at the winery is made from compostable material, and employees are encouraged to power down all non-essential electrical equipment, appliances and the like during non-operational hours.

At the same time, all surplus packaging materials are donated to local schools to be used in craft projects, and Estancia has also challenged all its vendors to satisfy "green" requirements for recycling, reducing and reusing.

Vineyard-based programs include the reduction of its herbicide use by more than 95 percent, choosing to controlled weeds with specialized tilling equipment, and using cover crops as a tool to protect against erosion, while encouraging native species and plants to flourish and enrich the soils.

Constellation Wines US also installed significant arrays at its Clos du Bois winery in Geyserville, California, and at its Ravenswood winery in Sonoma, California.

In all, Constellation Wines installed nearly 17,000 solar panels at its wineries, making the initiative the largest solar project in the US wine industry. The four systems produce a combined 3.95 MW of electricity.

"Our parent company has been very proactive when it comes to embracing sustainability and renewable energy," Kelley said. "As a result, all of Constellation's wineries and vineyards were recently certified as part of the California Sustainable Wine Growing Alliance's 3rd party certification program.

"In addition, Constellation wineries also participate in local programs such as the Sonoma Green Business program, the Napa Green program and the Fish Friendly Farming program, which have certified over 1,300 of Constellation's vineyards," he said.

To Kelley embracing renewable energy only makes sense.

"After all, wine is a very natural product," he said.

"As an industry, sustainability is something we believe to our core," he continued. "And it's such an important thing to remember as a business. I mean, ultimately, these practices and initiatives are beneficial to people, the environment and businesses alike."

Kelley said the winery "flipped the switch" on the new solar array in February, and he expects that the investment will pay for itself in about five years.

About the only challenge the program faces is northern California's sometimes spectacular fog.

"Fog, of course, effects solar, but we measured and calculated that effect when we were researching this project," Kelley said. "We also get about 10 inches of rain per year. We don't think any of that will be a problem, though... our maintenance program for the solar panels only requires us to squeegee them off four times a year."

#### **A life choice**

Keith Brien, director and winemaker of Australia's Silver Wings Wines, grows grapes at a small, high altitude vineyard on the slopes of Mt. Monument, 70 kilometers north of Melbourne, where he produces Pinot Noir and Riesling.

"The vineyard is in a relatively new viticultural region in the mountains north of Melbourne, not ventured into before the 1970s due to its cold, high altitude climate with a Mean January Temperature (MJT) of 18C," he said of the latter vineyard.

MJT is a standard of measurement that denotes the peak high temperature in a region. In Australia, that means January. In the northern hemisphere, that means July.

Brien established the Mt. Monument vineyard on a relatively modest six acre plot 13 years ago, but said an additional six acres has been prepared for planting when spring arrives in Australia next month.

The vineyard itself is located about 2,000 feet above mean sea level, but Brien said he transports the grapes to a central business district in the valley below, close to the Melbourne industrial suburb from which his wines are distributed.

Describing his operation, Brien said he produces his wine near the central business district where it's distributed.

"The cold conditions require excellent vineyard management to avoid disease and a very low crop level to achieve ripeness and produce a maximum of 2 tonnes of grapes per acre," Brien said. "However, over the last three years, I've only managed one tone per acre.

"The great difficulty we have in ripening the crop means high cost and marginal profitability," he concedes, but Brien is a true believer.

"The extremely high quality fruit is the appeal of vineyards in this area, although due to the wine being atypical of the mainstream Australian wine styles, niche marketing is essential to achieve effective sales," he said. "The grapes can be of sufficient quality that in the right hands, I believe the wines can achieve world class greatness with long cellaring capacity."

Despite the obvious challenges Brien faces at his vineyard, he too said he thinks long and hard about climate change and about the benefits of renewable energy.

"I think the biggest factor that has led me to consider bringing renewable energy to the vineyard is a desire to reduce my reliance on fossil fuels and the sound economics of doing so," he explained. "At the same time, I have always been conscious of the impact of polluting the environment, and anything that can be done to prevent this degradation is worthwhile."

"Since establishing my first vineyard in 1984, I have endeavored to establish an organic spray regime; this stemmed from the staggering chemical and industrial pollution I saw private and governmental bodies producing while I was growing up in Sydney," Brien said.

"[Later], my studies of viticulture lead to the realization that Europe and American had over-used chemical additions to the point that chemical-resistant strains of almost every vine disease had been created by their practices," he said. "For me it therefore became clear that the answer lay in reducing or eliminating chemical inputs from the beginning of planting vines, and that organics are the appropriate solution to any problem most, if not all of the time."

At present, the use of renewable energy at the Mt. Monument vineyard is in the planning stages.

"The vineyard is being converted to organic production with bio-dynamic production being the long-term objective," he said.

Bio-dynamic agriculture is a method of organic farming that treats farms as unified and individual organisms, emphasizing the interrelationship of soil, plants and animals as a self-nourishing system without external inputs.

"The winery is being planned to have light wells and sky lights, plus solar panel into the grid," Brien said. "At the same time, we plan to rely primarily on the hill-side elevation within the building design to utilize gravity feed instead of pumping wine from crusher to tank or tank to press, and so on.

"Our first winemakers' reserve Pinot Noir was gravity fed to the bottling line to reduce both power consumption and wind-shear within the pumping action," he continued. "These practices are actually copying the ancient winemaking systems before electric power was readily available."

Asked about the business case for such an approach, Brien admitted that "it's not the straight economics that make sense, but one's intent not to contribute to what he sees as a problem."

"Now, there may be a marketing advantage to taking a 'green' approach to winemaking, but that's pretty fickle, at best," he said. "Unfortunately, the political scene in Australia is a discouragement for householders and small industry to move to alternative energies because of additional charges and taxes associated with feeding into the national power grid."

Brien says every industry has its practical limitations when it comes to sustainability. But he too believes little changes mean a lot.

"Moving my winery to be closer to my home and distribution point has lowered by goods transport miles considerably," he said. "Producing lower volumes of high quality wine has meant the economics of production supply and sales

demand is more efficient and less onerous.

"The loss in turnover must be accepted as part of the equation and profitability will never be great – but that's a lifestyle choice on my part, to remain small and below the commercial pressures of mass marketing and supply," Brien continued. "In short, I have no desire to be a financial mogul and have difficulty continuing by contempt for the individuals in the greed-driven basis of world economics."

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