

# **Harvesting Savings: Energy Efficiency Roots Sustainability in the Wine Industry**

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## **ABSTRACT**

A growing number of vintners in California are embracing sustainability – making this industry ripe for innovative energy management techniques that can be applied to additional market sectors. This paper examines the role of energy management as the focal entry point for sustainability strategies throughout the wine making industry, explores trends of the measures being implemented and highlights case studies of wineries actively involved in efficiency efforts.

Resource Solutions Group's Wine Industry Efficiency Solutions Program (WIES) works primarily with small and medium-sized wineries in Pacific Gas and Electric's (PG&E) service territory and is funded by California utility ratepayers under the auspices of the California Public Utilities Commission. Working through collaborative partnerships that include Kenwood Energy, Cogent Energy, and PG&E, the program has provided comprehensive and unbiased energy management approaches, including financial analysis and efficiency recommendations, incentives, and implementation assistance to a large number of wineries. The WIES Team continually builds upon its expertise and program model to meet the needs of this key market sector.

Wineries involved in the program are usually motivated to implement energy management improvements based on several factors including: economics, wine quality, capital improvement needs and sustainability. Participants also are concerned with how system improvements are integrated and how the program can provide support in evaluating, analyzing, prioritizing and implementing the most cost-effective and applicable improvement measures that will bring the greatest return to the winery. Details of various system and equipment approaches available through the WIES Program are included throughout this paper.

The paper concludes with lessons learned from working with the wine making industry, and demonstrates emerging technologies bridged into real world applications, comprehensive approaches (beyond "low-hanging fruit" efficiency opportunities) and private industry embracing energy efficiency and sustainability in decision making.

## **The Wine Industry and Sustainability**

Is sustainability just a fad? Judging by the level of participation of California wineries, it's not. Approximately 900 California vineyards and wineries, representing 55% of statewide acreage and 63% of statewide production, have participated in sustainability workshops and undertaken self-assessments, while more than 5,000 have attended targeted education workshops to improve their sustainability practices (California Sustainable Winegrowers Alliance 2006). Wine and grape growers in the Northwest have similar or higher participation rates on an overall percentage basis in their own efforts to develop organic, sustainable and other environmentally sound practices for both grape growing and wine production.

## **Elements of Sustainability for a Winery**

What does sustainability mean? Like so many “green” trends, sustainability is a buzzword that can take on many different meanings depending on the industry, audience and practitioner. As defined by the California Sustainable Winegrowing Alliance, sustainability has three key elements: environmental protection, economic benefits and social equity. For the purposes of this paper, the focus is on environmental protection and practices. Some of the main sustainable practices for a winery are:

- Energy efficiency: selecting high efficiency equipment, adapting processes and improving operations to optimize energy consumption and reduce energy costs
- Renewable energy: opting to generate electricity onsite using renewable resources, with a primary focus on solar photovoltaic power systems
- Water efficiency: optimizing water use within the winery for washing grapes, cleaning equipment and barrels, bottling operations; efficient vineyard planting and irrigation practices
- Integrated pest management: use of “natural enemies” to reduce pests, reducing or eliminating use of harmful pesticides
- Sustainable farming: use of practices such as crop rotation, natural fertilizer, composting, integration of animals, plants and systems for optimal farm health
- Air and water quality: managing use and discharge of pesticides, fungicides, volatile organic compounds into groundwater and air wastewater effluent, soil erosion into waterways

## **Sustainability: Motivating Factors for Wineries**

Why are wineries becoming so involved with sustainability? While each winery and vineyard has its own reasons, there are some common themes among most wine industry representatives who have shown a commitment to environmentally beneficial practices. In our experience working with winemakers, first and foremost is that many wine makers believe that grapes grown organically or through other sustainable practices result in better products and therefore better wines. Many wine makers – and their customers – believe that sustainably grown produce has richer, truer flavors, resulting in superior wine quality. The other key reason for undertaking sustainable practices is undoubtedly the growing consumer demand for organic and environmentally friendly products. Sales of organically grown wines have seen double-digit annual growth in recent years, with acreage nearly doubling from 2000 through 2006 (Wine Spectator 2007). There is tremendous marketing appeal in offering wines produced through environmentally sound methods. While this is not always leveraged through overt marketing on the label itself, many wineries tout their practices through increased efforts to bring customers in for tastings and other on-site activities that build sales and reputation, as well as through web sites, wine clubs, newsletters and positioning with key retailers. In addition, vintners who invest in sustainability benefit from reduced energy and water/wastewater costs, and often fulfill a personal commitment to the environment.

## Energy Efficiency and Sustainability

Where does energy efficiency fit in with the broader goal of sustainability in the wine industry? In many cases, there are much broader or more visible investments that wine makers are seeking to make. Two examples of investments that translate most directly into appeal to environmentally aware customers: organically grown grapes fit the growing trend for organic foods at major retailers; solar panels are readily obvious to visitors and make for good tangible examples of a winery's commitment to the environment apparent for all to see. Compared to these major – and visible – activities, energy efficiency can seem dull by comparison. However, energy efficiency program offerings and state policy are combining to make it a practical, if not necessary, step on the way towards sustainability. In addition, by reducing a customer's baseload energy requirement through energy efficiency, alternate and renewable energy generation technologies can be pursued more cost-effectively and can be combined with an overall energy efficiency strategy to improve the overall economics of implementing both energy efficient upgrades and renewable technologies.

For California wineries, the focus on and pursuit of energy efficiency upgrades is supported by the state's solar programs and policies. At the state level, the California Solar Initiative requires that customers undertake energy efficiency audits prior to obtaining rebates. Starting in 2008, existing buildings are required to meet energy efficiency standards; therefore, many buildings must be upgraded for efficiency before meeting eligibility requirements for solar rebates. The policy rationale is clear; it is more sustainable, affordable, and practical to pay for solar installations on efficient buildings than to over-build solar to power inefficient buildings – particularly when subsidized by taxpayer dollars. For wineries seeking the visibility that investing in solar energy brings, the policy has raised awareness of the benefits of energy efficiency and encouraged many to view energy efficiency as the first step towards their ultimate environmental goals.

At the local level, efforts such as Napa Green Certified Winery Program and Sonoma Green Business certification, as well as city or county green building requirements offer incentives, recognition, or requirements for wineries to choose from a broad array of environmentally friendly practices that typically include energy measures. Also, workshops such as those co-sponsored by PG&E and the California Sustainable Winegrowing Alliance over the past few years, have been attended by hundreds of wineries and vineyards and have contributed to a large number of wineries adopting new efficient technologies or improved operating practices as a direct result of these workshops.

A winery's business is making wine. The winemaker is focused on growing grapes, the quality of fruit, crushing grapes, ensuring proper fermentation, cold stabilization, bottling, labeling, marketing and selling wine. Winemakers recognize that it takes a well run, well maintained facility with reliable equipment to ensure that the wine making process results in the best product. However, even though winery energy costs are high, wineries are more concerned with product quality and reliable facility operation than with energy efficiency.

As a result of the utility's historic and ongoing efforts to provide information on its efficiency programs, most wineries are aware of utility administered rebate programs, but many wineries have had marginal success using them because of the difficulty proving energy savings on unique, customized equipment modifications. Since their business is winemaking, they do not have the expertise necessary to easily implement energy efficiency. The wineries need assistance in understanding energy efficiency opportunities, evaluating the economics of an energy

efficiency project to gain the approval of the winery's capital budget group, specifying a project to ensure that competitive bids are comparable and installing equipment.

## **The Wine Industry Efficiency Solutions Program**

Resource Solutions Group (RSG) launched the Wine Industry Efficiency Solutions (WIES) Program as part of the 2006-2008 energy efficiency program portfolio administered by Pacific Gas and Electric Company (PG&E). The program targets small- and mid-sized wineries throughout PG&E territory for cost-effective energy efficiency upgrades. RSG developed and implements the program in partnership with two key engineering subcontractors, Kenwood Energy and Cogent Energy and coordinates closely with PG&E's Customer Energy Efficiency department and Service and Sales staff to ensure that the program complements PG&E's own offerings to the wine making industry.

### **Program Overview**

The goal of the WIES Program is to provide unbiased technical service, education and implementation support through a tailored energy management approach to wineries. Program representatives help customers identify, evaluate and promote the installation of energy efficiency measures to reduce operating expenses and improve the efficiency of facility operations. The program is designed to be comprehensive in scope yet customized for each participant in order to avoid lost opportunities and meet the increasing desire among wineries to be "green." Some of the key program elements that help WIES succeed in delivering in a way that meets the needs of smaller and medium sized wineries are described below.

### **Comprehensive Energy Audits and Reports**

RSG and its partners conduct energy audits that address the whole facility, including all systems, processes, and energy consuming equipment to identify cost effective energy efficiency upgrades. The audits frequently identify customized measures that require calculations and analysis to determine the potential energy savings (and therefore incentive level) unique to each customer's situation. When appropriate, RSG also integrates additional resource savings potential, such as opportunities for savings through water efficiency, renewable energy, and demand response. RSG delivers audit reports that outline clearly and comprehensively the recommended efficiency upgrades, covering all cost-effective measures. Detailed information is presented for each of the recommended measures including financial considerations such as simple payback, net present value and internal rate of return, as well as a life cycle cost analysis that demonstrates that when financed, energy efficiency investments can pay for themselves. The comprehensive audit report format highlights key points for decision-makers and provides a list of prioritized recommendations for measure installation.

### **Incentives & Installation Support Services (IS Services)**

To encourage project installations, the WIES Program provides incentives to encourage the installation of qualified measures. RSG provides base rebates equivalent to those offered through PG&E's energy efficiency programs. In addition, the program offers bonus incentives

for reaching program commitment and installation timeline milestones. The bonus incentives often motivate fast action by customers, which in turn allows customers time to implement additional projects within the program period, eventually expanding program opportunities and capturing significantly more total savings than is possible with a typical once-through program approach.

Working closely with Kenwood Energy, RSG designed IS Services to offer customized support to wineries needing assistance with the time consuming and sometimes confusing process of implementing recommended energy efficiency measures. This assistance is especially valuable to smaller and medium size customers who do not have energy, facilities or equipment specialists with the knowledge and experience to implement energy efficiency upgrades on their own. Typical IS Services might include engineering support, bid package development, bid support, contract support, project installation support, project management, custom measure documentation development and quality assurance. RSG finds that many customers view the services as essential to achieving their energy-savings objectives because they provide the missing link between audit results and project installation, resulting in more customers able to turn energy efficiency recommendations into installed projects.

### **Unbiased Customer Support**

RSG does not sell products and is not an installation contractor seeking to secure a contract for project installation. RSG's goal is to help customers understand how energy efficiency and an effective energy management strategy can improve their operations and positively impact their bottom line. Providing this unbiased and customer focused approach tends to improve service provider credibility and reduce confusion about which energy efficiency technologies and practices to pursue. The approach also leads to higher follow-through and implementation of measures as technology and service provider credibility is established. The process also frequently results in continued participation for installation of multiple energy efficiency measures, which could lead to a broader commitment to sustainability that goes beyond energy efficiency.

### **Collaborative Partnerships**

One of the critical success factors in the WIES Program is the collaboration that takes place between PG&E and RSG, as well as core RSG team members such as Kenwood Energy and Cogent Energy. PG&E and RSG have worked hard to establish a clear understanding of which winery customers would be covered by different programs and can provide mutual referrals when identifying good candidates for energy efficiency upgrades. PG&E has a strong presence in the winery community, collaborating with the California Sustainable Winegrowing Alliance to deliver workshops that educate wineries on energy efficiency solutions and operational best practices; PG&E often invites WIES Program team members and other energy efficiency service providers to these workshops to ensure that participating wineries are aware of all the opportunities available to them.

## Program Participation

Participation with the WIES Program typically follows several key steps. First, the customer expresses interest in receiving an energy audit. The customer may have become aware of the program opportunity through RSG's targeted one-on-one customer outreach efforts or through industry workshops, by hearing about the program from PG&E or other environmental and energy groups working in the wineries sector, or alternatively, RSG may follow up on a referral from a PG&E program staff member or account manager. Once the customer has signed a Program Participation Agreement allowing RSG access to its facilities and the ability to develop an energy audit report, RSG determines the appropriate team member(s) to conduct the audit. A preliminary screening helps to identify the customer size, key areas of interest, likely focal technologies, willingness to invest and other factors that will determine the technical and customer service expertise required for the audit and related follow-up. The energy audit, conducted by a WIES Team engineer, identifies the energy efficiency measures that will best suit the customer and are appropriate upgrades for the facility. Following the audit, the engineering team will conduct analysis and perform calculations to develop a customized audit report that details the recommended measures in context of the specific winery, expected investment cost and energy and cost savings for each, and presents an investment analysis including net present value and internal rate of return. The team works closely with the winery to select the right mix of measures to install. The winery a draft Project Implementation Agreement outlining the cash rebates, bonuses and IS Services available for implementation of selected measures. By working closely with each winery, the team understands and educates the customer on how the upgrades fit into the customer's overall sustainability goals and economic plan and will encourage the customer to pursue the installation of the recommended upgrades that fit the customer's financial and operational requirements.

Working closely with PG&E, through wine industry channels and soliciting customer participation on its own, RSG has been very successful in identifying and signing up customers in the WIES Program. Below is a table identifying key program successes to date:

<b>WIES Program Snapshot</b> (as of March 31, 2008)	
Number of participating wineries	76
Number of audits completed	70
Committed projects to date	40
Committed savings to date	
Net annual kWh	5,644,804
Net kW	1,349
Net therms	122,190
Installed energy savings to date	
Net annual kWh	1,050,492
Net kW	272
Net therms	99,506

## **Technologies**

The comprehensive audits address the major end uses of energy in a winery: heating, refrigeration, lighting and wastewater treatment. Typical recommended measures include: tank insulation, compressed air system improvements, central chiller improvements, premium efficiency motors, Variable Frequency Drives (VFDs), office and warehouse lighting, lighting controls, and premium efficiency aerators and/or dissolved oxygen controls for the wastewater ponds. The team also seeks opportunities to integrate emerging technologies into the customer's energy management strategy, as well as evaluating opportunities to integrate demand response, water efficiency, and solar power into the customer's overall long-term plan. One such example of an emerging technology is electro dialysis which is designed to replace mechanical chilling in the wine stabilization process.

Interestingly, the most common measures installed through the WIES Program are not lighting related as one might expect for lower-cost, quick savings opportunities. Rather, the most common installed measures are those that not only require a higher investment level but also garner higher incentives and long-term savings for the customer to encourage innovative approaches to improving the overall efficiency and operations of the winery facility.

## **Winery Profiles**

### **St. Supéry Vineyards and Winery**

St. Supéry is a Napa Valley-based winery that produces approximately 120,000 cases of wine per year. Its production focuses on the classic Bordeaux varietals of Sauvignon Blanc and Cabernet Sauvignon while producing a total of 18 different varietals of wine. The facility is a single building that houses offices, an art gallery, production and storage, plus the original house that is used for offices and tours.

St. Supéry is committed to environmentally friendly practices. Current efforts include using recycled wash water (from cleaning tanks and barrels) for landscape irrigation, using recyclable packaging material and maintaining a healthy ecosystem of diverse plants and animals on the vineyard property. The winery participates in the Napa Green Land program, following practices to protect regional watersheds through soil and water conservation among other activities that will protect fisheries and other water-related habitats.

St. Supéry was the first participant in the WIES Program. During the initial meeting with the winemaker at St. Supéry, he indicated that in general they were interested in pursuing efficiency upgrades that offered a 2-4 year payback, but was initially interested in exploring a possible incentive for the installation of an electro dialysis (ED) system. As ED is a relatively new technology and the energy savings is based on winery-specific characteristics and wine stabilization practices, the WIES Team was asked by PG&E to work with its engineers to analyze the savings estimates associated with this emerging technology and eventually develop the calculation tool necessary to qualify the project for incentives and secure a rebate for the customer. Working closely with PG&E's consulting engineer, the calculation tool was finalized and validated by PG&E's Emerging Technology Group, allowing RSG to secure a rebate for St. Supéry and to have in place an approved calculation methodology to secure incentives for future electro dialysis applications.

Following this initial effort, the WIES Team was asked to conduct a comprehensive audit of the facility to identify additional energy management strategies to support the customer's goal of improving efficiencies and becoming more sustainable. As a result of the audit, RSG identified over 200,000 kWh in annual electricity including savings associated with refrigeration improvements, motors, lighting, and pumping efficiency improvement opportunities. Demonstrating its position as an early adopter of new technologies and interested in a comprehensive strategy to improve overall efficiencies, St. Supéry elected to move forward with both the electro dialysis installation and the other measures identified through the energy audit.

Electrodialysis technology offers an energy efficient option to chiller stabilization. With ED, a relatively weak electric field and specialized filtration membranes are used to remove the tartrates, resulting in significant energy savings compared to a typically energy-intensive cooling process that reduces the temperature of the wine to a low level and retains it for several weeks. It is claimed that ED also improves wine color and results in quicker turn-around of the wine. The ED calculation tool estimated St. Supéry's ED energy savings to be 82,000 kWh and 294 therms in annual savings. The ED calculation tool continues to be used by the WIES Team to provide energy savings estimates for the ED technology for participating wineries. While the ED technology represents a significant investment, the WIES Team will often include ED in the audit report recommendations as a way to familiarize wineries with this emerging technology.

In addition to the ED, the winery committed to installing all of the other energy efficiency measures identified in the audit report. The overall project included:

- An lighting upgrade where the existing T12 florescent fixtures were replaced with T8s,
- Air conditioning system modification that allowed for the separation of the HVAC system used to chill a barrel storage area from the refrigeration system used to chill the wine through tank jackets. Since the tank jackets must be maintained at a lower temperature, by separating the two systems the HVAC system can be operated at a higher set-point temperature thus saving energy,
- Premium efficiency motors for glycol pumps and cooling towers
- Variable frequency drives to modulate the operation of glycol pumps to meet the needs of the system ranging from slow periods to peak season when demand for chilled water reaches the maximum system potential;

To support St Supéry's project installation efforts, the WIES Program provided cash incentives as well as IS Services. IS Services provided to St Supéry in support of this project included the development of a bid specification for the lighting project to secure competitive contractor bids, support in the lighting bid process, working with the facility's preferred vendor to analyze, design and implement the refrigeration projects and general engineering support on the VFD installations.

In addition to providing energy efficiency recommendations, the WIES Team also provided a photovoltaic (PV) solar analysis. The analysis included a lifecycle cost and savings summary highlighting the overall power generated by the proposed system and financial value of the project, taking into consideration the size of the proposed PV system, available tax credits, incentives, depreciation and the value of the generated energy.

After receiving the PV solar analysis, the wine maker was interested in getting PV installation bids from contractors that could be presented to the winery owners. WIES Team member, Kenwood Energy, under separate contract, worked with the wine maker to develop a



detailed PV solar proposal and analysis to present to the owners. Kenwood Energy developed bid documents, identified potential bidders and evaluated bids received to support the winery owner's decision-making process. In the end, the owners decided not to pursue the PV installation due to the lower economics of the project compared to other investment opportunities.



The fact that St. Supéry chose to implement all of the energy efficiency projects identified demonstrates the value of providing comprehensive analysis, whether it's evaluating the costs and benefits of a new emerging technology or providing a full suite of energy efficiency recommendations. Providing practical and applicable analysis and recommendations driven by the needs of the customer leads to the installation of viable,

cost saving facility improvements that support the customer's sustainability goals while improving the operational aspects of the wine making process.

### **Ferrari-Carano Vineyards and Winery**

As part of its commitment to excellence in winegrowing, Ferrarri-Carano practices sustainable farming in all four of its vineyards by integrating composting, using cover crops to



reduce soil erosion, using integrated pest management techniques and promoting greater ecosystem health. The winery staff was very interested in identifying opportunities to improve the energy efficiency of its facility with the end goal of saving money. As the winery facility staff had some down time after the harvest season and was anxious to get started on upgrades right away, during the on-site energy audit the WIES Team discussed some initial projects worth pursuing. Even before the audit report was delivered, the winery staff agreed to upgrade the lighting throughout the facility with T8

fluorescent fixtures with motion sensors. The facility manager reported that prior to the lighting retrofit, he was constantly reminding staff to turn off the lights when they were not needed. These reminders are now no longer necessary as the lights turn off automatically when not needed and the winery staff is thrilled with the improvements to the overall lighting quality.

The facility staff also reported to the WIES Team that they noticed that their compressed air system was operating 16 hours over the weekends when no one was on site using the system.

With typical air compressor systems having leaks in the range of 20-30%<sup>1</sup> of system capacity, the winery was wasting a great deal of energy running the system continually to keep the compressor lines charged. By installing a solenoid valve and timer on the compressed air system, the WIES Team estimated that the winery could save over 52,000 kWh per year for this low cost modification.

In addition to the lighting upgrades and compressed air system modification, the energy audit report identified opportunities to upgrade the motors, add VFDs, enhance the refrigeration system, and improve the wastewater aeration method, as well as electro dialysis. The report also outlined the facility's historical usage and energy cost with an electrical energy use breakdown to show where the energy is being used throughout the facility. This was of particular interest to the winery facility staff as the energy bills were sent to the financing department and they had no information on how much energy was costing them. The report also outlined PG&E's Demand Response Program and detailed the cost savings opportunities for participating in the program. Specifically, the report identified how by reducing the chiller and/or lighting loads in response to peak energy pricing periods, the winery would be able to reduce its energy costs through Demand Response. The report also included a PV solar analysis that provided the winery owners with an overview of what's involved in the installation and operation of a solar photovoltaic system and the associated economics.

The WIES Team is continuing to work with the winery to improve the efficiency of its refrigeration system. The current project includes a refrigeration system modification and the installation of glycol pump motor VFDs to enhance the system operation and save energy. The winery owners were so happy with the results from the first audit that they asked the WIES Team to conduct an audit of a second facility. Seeing first hand the improvements to their facility has motivated them to continue to implement efficiency measures at all of their facilities through the WIES Program.

### **Martin Ray Winery**

While it has operated under several different names, Martin Ray Winery is the oldest winery in Sonoma County that has been running continuously, with a rich history dating back to 1881. The winery houses a one million gallon production facility that is used not only for labeled wine production, but also as a 'custom crush' facility where over 20 clients crush their grapes. Both individuals and the winery as a whole share a commitment to sustainability.

Martin Ray is very typical of many small to medium wineries where there is no dedicated facilities staff and it is the wine maker's responsibility to manage and maintain the facility and wine making equipment. This type of customer is a key target of the WIES Program since they are often motivated but are unsure what to do and are often suspicious of the advice provided by



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<sup>1</sup> Department of Energy; Office of Industrial Technologies; Compressed Air Fact Sheet #7; April 1998  
Compressed Air Energy Efficiency Measure Information Sheet; Bonneville Power Authority; 2006

vendors. An energy audit conducted by the WIES Team showed that the winery had spent more than expected on electricity the prior year with the majority of consumption going to refrigeration. The WIES Team identified energy efficiency upgrades that could reduce electricity use by almost 50%. The wine maker was motivated to make improvements to the operations and secured the owner's commitment to funding upgrades outlined in the audit report. The winery undertook a significant project targeted at insulating all of the exterior wine tanks. By insulating exterior tanks, they reduced the tremendous heat gain from the solar load, reducing demand on the chiller system. As a result, energy bills during the busiest "crush" season have declined by about 30%. Martin Ray has also reduced peak energy demand through this upgrade, saving the winery utility demand charges during the summer peak period and reducing load on PG&E's distribution system. The estimated savings from Martin Ray's wine tank insulation process was approximately 318,000 kWh for installing 16,390 square feet of tank insulation.

The winery also implemented the recommendation to installed dissolved oxygen (DO) sensor controls on the two mechanical surface aerators used for the wastewater treatment pond. The aerators were being controlled by a timer and set to run 8 hours a day during the peak harvest period and 6 hours per day during the off-season. The WIES Team recommended installing a DO sensor control that would monitor the dissolved oxygen and shut the aerators off when the levels reached a pre-determined set-point of 2 mg/L dissolved oxygen. The estimated savings for this project was 13,000 kWh.

As a second phase of the project, the WIES Team is working with Martin Ray to insulate approximately 4,000 feet of un-insulated glycol pipe that delivers chilled glycol to the interior and exterior wine tanks. By reducing the heat transfer from the pipe to the surrounding air the project is estimated to save the winery over 49,000 kWh per year. To support these projects, the WIES Program will be providing approximately \$55,000 in cash incentives directly through its program as well as IS Support Services to the winery. The majority of the IS Support Services will be focused on developing the required custom measure calculation documentation for the DO sensor control and glycol pipe insulation projects.

The wine maker has also expressed interest in implementing the additional refrigeration and VFD projects outlined in the energy audit report. The winery is implementing the projects in phases due to funding constraints and hopes to implement the additional projects in 2008.

## **Wine Industry Challenges to Sustainability**

One of the major challenges to the wine industry's investment in sustainable measures is the current trend of smaller wineries being purchased by large holding companies. This disassociates the financial decision-makers from the day-to-day operations of the winery and extends the budgeting timeframe significantly. Most of these larger companies tend to develop annual budgets and make investment decisions in the fall of each year for the following year. The timing is such that the winery staff is fully engaged in harvest and crush and does not necessarily weigh in as strongly as they otherwise might to push for priority efficiency projects. Budgeted projects can be implemented the following year, but as RSG has found in the WIES Program, if not included in the budget, even cost-effective energy efficiency and other sustainable measures will not be implemented for months to a year, at best.

A related challenge is simply the cost of investing in energy efficiency and other sustainable measures. Many individuals and entire wineries are committed to the environment, yet lack the resources to spend the required money to upgrade their facilities. The challenge of

resources applies across the board, from the smallest wineries making fewer than 5,000 cases each year to the large consolidated companies with profitable parent companies. Of course, incentives offered through ratepayer and state funding, such as PG&E's incentives, those offered through the WIES Program, and solar installation rebates all help to defray costs and altogether improve the return on investment for the customer.

In one specific area where RSG has attempted to make headway – improved water use practices – there are challenges to wineries' motivations to reduce water consumption and wastewater discharge. In many cases, wineries use untreated groundwater for vineyard irrigation and possibly for use within the winery (for tank and barrel washing). They tend to have their own wastewater ponds, and after on-site treatment, the water can be discharged or reused for irrigation. Therefore, there is little cost incentive to reduce either consumption of treated water or wastewater discharge. There are exceptions, in the more land-constrained areas where on-site water treatment is not feasible, or among wineries who have committed to a broad sustainability goal that includes efficient use (and reuse) of water and protection of regional watersheds.

## **WIES Program: Lessons Learned**

One of the most obvious conclusions that RSG has drawn from its work in the wineries sector is that there is tremendous benefit to conducting comprehensive energy audits and providing a holistic and comprehensive presentation of all feasible efficiency measures to implement. When working with wineries that have a significant commitment to sustainability, providing a strategic and comprehensive technical and financial analysis for specific energy efficiency measures encourages wineries to install high efficient equipment for reasons other than first cost or simple payback. Participants in the WIES Program have opted to implement very costly energy efficiency upgrades for a variety of factors, including their desire to showcase new technologies, the anticipated improvement to the winemaking process or resulting product quality, increased productivity or morale for winery staff or simply to go beyond the expected to make a larger commitment to energy efficiency as part of their path towards sustainability. In some cases, WIES simply identified energy efficiency upgrades that were well-timed with equipment upgrade needs and provided very specific recommendations that resulted in equipment replacement meeting more energy efficient specifications than otherwise would take place.

Another key lesson that RSG has derived from its work in the wineries sector is that there is an ideal targeted customer size for optimizing program energy savings. The larger customers are served directly by PG&E's account managers and in many cases may not need to avail themselves of additional or alternative program incentives or services. Smaller wineries often use little energy to begin with and the upgrades that are even feasible are comparable to what could be achieved in a residential setting. The ideal customer size is the medium-size wineries that have significant energy load, yet have not had the hands-on assistance from the utilities that the larger wineries receive. PG&E identified this gap and specifically works with RSG to ensure that the mid-size customers receive a fuller suite of comprehensive services that can lead to viable efficiency installations; in fact, PG&E program staff and account managers often provide referrals to customers who can benefit from program services but are not large enough to warrant an assigned account manager.

The Installation Support Services program component is designed as a specialty category of incentives offered by RSG. In serving wineries, and specifically medium size wineries,

another major lesson is that these customized services tailored to the needs of each program participant make all the difference in terms of avoiding lost opportunities and achieving real long-term energy savings. Wineries are of course focused on making and selling high quality wines. The facilities staff is focused on processes and equipment as they pertain to the quality of the wine, not to optimizing energy consumption. The detailed attention given to each customer through the audit process to identify energy savings opportunities and ongoing assistance offered through Installation Support Services, allows the RSG team to serve as an extension of the customer's staff, focused specifically on reducing energy use and the customer's carbon footprint. RSG has streamlined its approach to conducting audits and providing Installation Support Services to ensure that the audit identifies energy savings that are consistent with typical wine making practices (including specialty processes for specific types of wines), addresses the key concerns of this sector and delivers quality customer service that helps customers make the right choices for their facilities.

The ongoing relationship with the wineries that results from this type of customer service leads to yet another lesson learned: successful projects lead to more successful projects. As demonstrated by each of the wineries profiled in this paper, customers who are pleased with their energy efficiency upgrades become true believers and are increasingly willing to invest in energy efficiency. RSG has seen numerous multiple-project customers through the WIES Program, and to date, about 15% of participants have completed additional audits and/or installations for other owned facilities. By leaving customers with positive experiences with energy efficiency, as well as with recommendations for pursuing new and emerging technologies, evaluating water efficiency opportunities and renewables, RSG feels that the WIES Program – and energy efficiency more broadly – can serve as one of several entry points to improving sustainability and move a winemaker towards a permanent commitment to protecting the environment - in their vineyards, in their purchasing practices, in their processes and in their choices related to packaging, transportation, and shipping.

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Napa Valley Vintners. *Wine Industry Facts.* [www.napavintners.com](http://www.napavintners.com). {Note: approximately 10% of California wineries are in SCE territory, including the Temecula winegrowing region.}