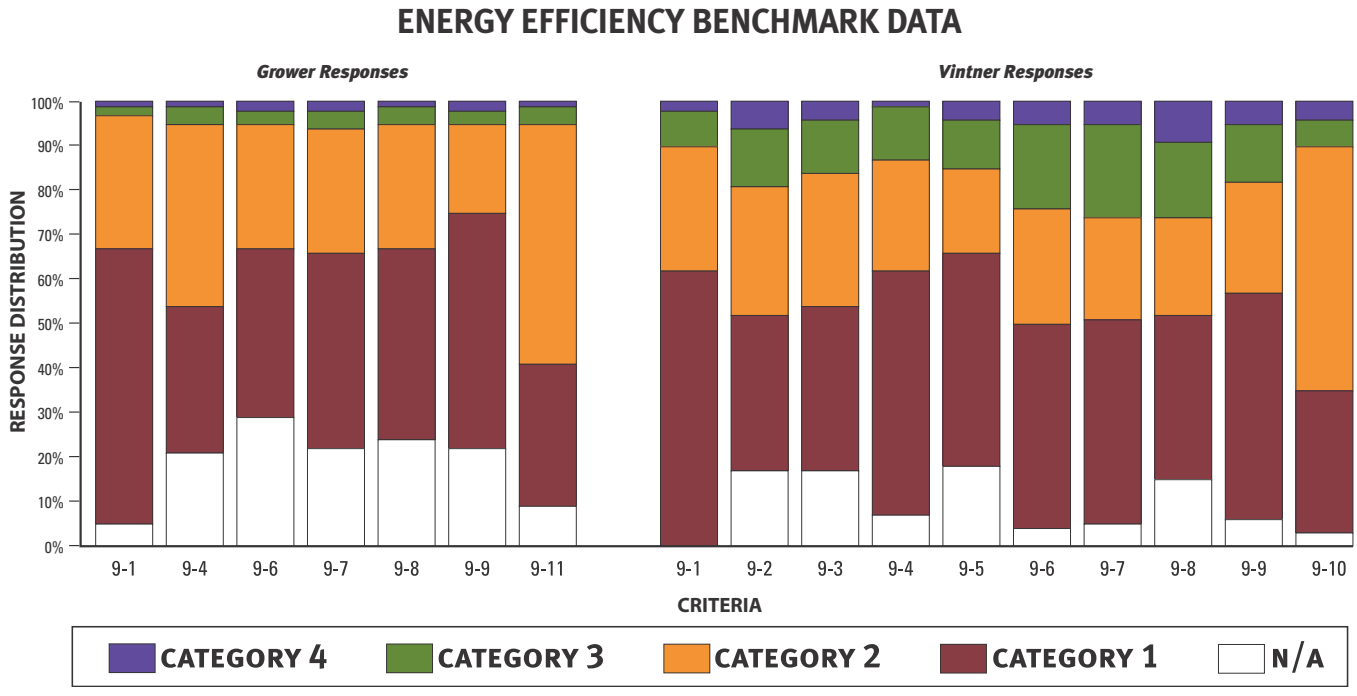
Chapter 9
ENERGY EFFICIENCY

Background

As the most recent energy crisis demonstrated, once secure sources for energy can be made vulnerable in a very short period of time. Most everyone was caught off guard in the summer of 2000 by rolling blackouts and rapidly increasing energy costs. While this element of vulnerability has been stabilized in the near-term, projections for increasing demand from the state's growing population challenges the existing capacity for energy generation and distribution.

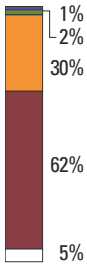
These trends highlight the importance of vineyard and winery operations reviewing, and if necessary, updating their energy use and conservation plans. It is now essential to have a comprehensive plan that includes conservation and energy efficiency, while investigating and utilizing alternative energy sources where possible. Having contingency options in place to be able to meet the energy needs at crucial times, such as on-site generation capabilities, will also allow operations to continue uninterrupted during crisis periods.

Solar energy is the primary energy source for the fruit in the vineyards. Each year, more wineries each year are using that same source to provide energy for their winemaking needs. In addition to solar panels on the roofs, there are now growing numbers of solar aerators in wastewater ponds and solar pumps in vineyards that expand the use of this universal power plant. Taking control of the energy used in wine production is one of the best forms of energy security that a vineyard or winery can make. One very simple place to begin is with an energy audit. Knowing how much energy each operation uses is the first step to creating a comprehensive energy management and conservation program. Once current energy demand is determined, conservation and efficiency strategies can be developed and implemented.

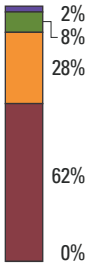


Benchmark Data

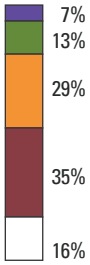
Grower Response



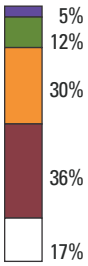
Vintner Response



9-1. PLANNING, MONITORING, GOALS AND RESULTS To begin a comprehensive energy management and conservation program, a winery or vineyard needs to have a plan. 3% of growers and 10% of vintners have developed and implemented a comprehensive energy management plan that includes monitoring and recording total energy with yearly goals. 1% of the growers and 2% of the vintners have implemented at least half of their plan, while 2% of growers and 8% of vintners have implemented 25% of their plan. 30% of the growers and 28% of vintners have conducted an energy audit over the past two years and are using the results in their decisions on maintenance, improvements and employee training. 62% of growers and vintners have a general idea of their total energy use. 5% of growers replied N/A, not applicable or information not available.

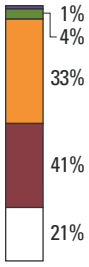


9-2. REFRIGERATION SYSTEM One of the biggest consumers of energy in a winery is the refrigeration system. 20% of the vintners have conducted an energy audit of the refrigeration system during the past 3 years as part of an overall energy conservation plan, selected technologies for optimal performance and have taken measures (e.g. building insulation, night air cooling) to reduce chiller loads. 7% of vintners also use energy efficient technologies throughout the refrigeration system. 29% of the vintners have done an energy audit in the past 3 years and operate their equipment for optimal performance. 35% of the vintners have not had an energy audit in the past 3 years and operate their refrigeration system in the same way since installation. 16% of vintners replied N/A, not applicable or information not available. Some winemakers process their wine at a custom facility and therefore do not use refrigeration systems of their own.

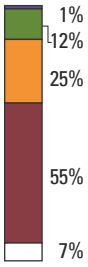


9-3. TANKS & LINES Moving wine in and out of tanks and throughout the winery requires an enormous amount of energy. Understanding the amount of energy needed is the first step in being able to efficiently conserve energy at the winery. 47% of the vintners have conducted an energy audit of the tanks and lines during the past 3 years; insulate their glycol lines; equip some tanks with insulation jackets; and locate tanks to reduce cooling and heating needs. 12% of the vintners have conducted the audit as part of an overall energy conservation plan, insulate 50% or more of their tanks and locate 50% or more of their tanks to reduce cooling and heating needs. 5% of vintners insulate and locate more than 80% of their tanks and incorporate energy conservation into their employee training programs. 36% of the vintners have not had an energy audit in the past 3 years and operate their tank system in the same way since installation. 17% replied N/A, not applicable or information not available.

Grower Response

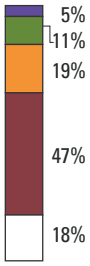


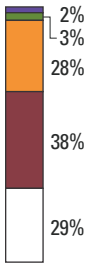
Vintner Response



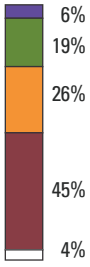
9-4. MOTORS, DRIVES & PUMPS Awareness of overall energy consumption aids winemakers and winegrowers in targeting specific areas that consume the most energy. One of these areas includes motors, drives and pumps. 5% of growers and 13% of vintners have done an energy audit focusing on motors, drives and pumps as part of their energy management plan, with 1% of growers and vintners testing technologies to improve the energy efficiency of these devices. 33% of growers and 25% of vintners have done an energy audit in the past three years and maintain the existing equipment for optimal performance. 41% of the growers and 55% of the vintners haven't done an energy audit and run the equipment the same as when they installed it. 21% of the growers and 7% of the vintners replied N/A, not applicable or information not available.

9-5. HEATING, VENTILATION & AIR-CONDITIONING (HVAC) One major energy user at the winery often overlooked for conservation potential is the HVAC system. 16% of the vintners have had an energy audit of the HVAC system in the past 3 years, reduce heating and cooling loads (e.g. louvered roof panels, temperature controlled cellars) and have regularly scheduled maintenance. 5% of these vintners also record the maintenance, test new technologies and use energy efficient technologies throughout the HVAC operation. 19% of vintners have conducted an energy audit in the past 3 years, have regularly scheduled maintenance and operate existing equipment for optimal performance. 47% have not had an energy audit on their HVAC system and operate the equipment the same as when they installed it. 18% of the vintners replied N/A, not applicable or information not available.

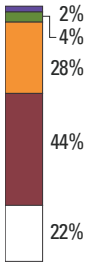




9-6. LIGHTING – OFFICES & LABS Wineries have many more lighting needs throughout their operation than vineyards. For inside lighting of offices and labs, 5% of the growers and 25% of the vintners have had an audit in the past 3 years as part of an overall energy conservation plan; include lighting fixtures in the cleaning procedures; use compact fluorescent lights; and use task lighting. 2% of the growers and 6% of the vintners also use energy efficient lighting technologies and designs throughout the winery. 28% of the growers and 26% of the vintners have had an energy audit but do not include lighting fixtures in the cleaning procedures and use compact fluorescent lights in most locations. 38% of the growers and 45% of the vintners have not had an energy audit in the past 3 years and use the lighting system the same as when they installed it. 29% of the growers and 4% of the vintners replied N/A, not applicable or information not available.

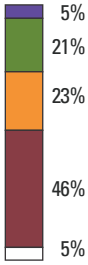


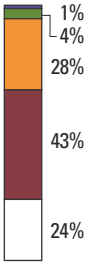
Grower Response



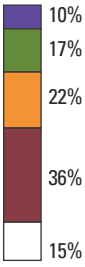
9-7. LIGHTING – SHOPS & FACILITIES Some vineyards and wineries have large areas in shops and facilities that need to be lit. 6% of the growers and 26% of the vintners have had an audit in the past 3 years as part of an overall energy conservation plan; include lighting fixtures in the cleaning procedures; use compact fluorescent lights in most locations; and use task or natural lighting to illuminate work areas. 2% of the growers and 5% of the vintners also use energy efficient lighting technologies and designs throughout the shops and facilities. 28% of the growers and 23% of the vintners have had an energy audit but do not include lighting in the cleaning procedures and use incandescent lights in most locations. 44% of the growers and 46% of the vintners have not had an energy audit in the past 3 years and use the lighting system the same as when they installed it. 22% of the vintners and 5% of the vintners replied N/A, not applicable or information not available.

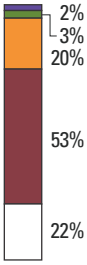
Vintner Response



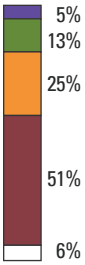


9-8. LIGHTING – OUTDOOR & SECURITY Wineries have more of a need for outdoor and security lighting than the vineyards. 5% of the growers and 27% of the vintners have had an audit in the past 3 years as part of an overall energy conservation plan; include lighting fixtures in the cleaning procedures; use mercury vapor lights in most locations; incorporate motion detectors into security lighting design; and consider sodium and/or sulfur lamps. 1% of growers and 10% of vintners also use sodium and/or sulfur lamps, clean the lights annually and train security guards to turn off lights. 28% of the growers and 22% of the vintners have had an energy audit but do not include lighting in the cleaning procedures and use incandescent lights in most locations. 43% of the growers and 36% of the vintners have not had an energy audit in the past 3 years and use the lighting system the same as when they installed it. 24% of the growers and 15% of the vintners replied N/A, not applicable or information not available.



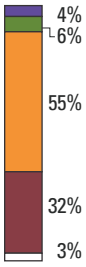


9-9. OFFICE EQUIPMENT While wineries tend to have more need for office equipment than growers, it does consume energy and is part of the overall energy considerations for a vineyard or winery operation. 5% of the growers and 18% of the vintners include office equipment in their comprehensive energy management plan, turn off equipment when not in use and consider energy consumption when upgrading or replacing equipment. 2% of these growers and 5% of these vintners test new technologies to improve office equipment efficiency and, whenever possible, purchase office equipment that is Energy Star certified. 20% of growers and 25% of vintners have had an energy audit in the past 3 years, turn off the equipment when not in use and have management support for improving the energy efficiency of office equipment. 53% of growers and 51% of vintners haven't had an energy audit and run their office equipment the same as when it was installed. 22% of growers and 6% of vintners replied N/A, not applicable or information not available.

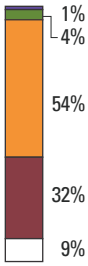


Grower Response

Vintner Response



9-10. ALTERNATIVE SOURCES OF POWER With the increasing volatility of the energy delivery system, wineries can begin to ensure their own energy security by increasing the diversity of energy sources that they have available to power the winery operations. 4% of the vintners have selected an alternative energy source; have prepared a detailed financial plan; have had alternative sources assessed by a professional company; and have implemented an alternative source (e.g. solar, wind, methane digesters). 6% have selected an alternative, prepared a detailed financial plan for solar and have visited a site using an alternative energy source. 55% of vintners have an idea of where they get their energy and are researching potential alternative energy sources. 32% don't know where their energy comes from and have a limited awareness of alternative energy sources. 3% of vintners replied N/A, not applicable or information not available.



9-11. ALTERNATIVE FUEL SOURCES Farming equipment is a main consumer of energy in the vineyard. One way to reduce consumption is to switch to alternative fuel sources. While 59% know how much fuel is used in the vineyard, 5% also track the use. In addition, 1% of vintners are using at least one alternative fuel. 32% don't know how much they use and know nothing about alternative fuels. 9% replied N/A, not applicable or information not available.

Best Practices

Statewide Strengths: Even though the energy efficiency criteria are extremely challenging, there are some growers and vintners for each criteria that reported using category "4" or "3" practices. The percent of reported use of category "4" or "3" practices by growers or vintners ranged from 3% to 27%, depending on the criteria. These growers and vintners can serve as mentors for future energy efficiency education and outreach efforts.

Fetzer Vineyards takes its energy demands seriously, from the source to its end use. Since 1989, Fetzer has been supplied with 100% renewable or "green" power for all its electrical needs and has promoted self-generation with a 40 kilowatt solar display and a 75 kilowatt cogeneration unit at its Hopland facility. In addition, a manmade reedbed was established to treat process wastewater. This constructed wetland saves kilowatts by reducing the amount of aeration used. Fetzer has also made a concerted effort to reduce its greenhouse gas emissions by using bio-diesel, made from vegetable oil, to power its vineyard tractors and their on-road big rigs. According to Pat Voss, Managing Director of Fetzer Vineyards, "Our commitment to being environmentally responsible continues to benefit not just the environment, but our financial bottom line as well."

Targets for Continual Improvement

Statewide Opportunities for Improvements: There are opportunities for the majority of growers and vintners to improve energy efficiency practices for all criteria.

The California Sustainable Winegrowing Alliance has set a desired goal of demonstrating improvement in the scores indicated below. By harvest 2009, CSWA will strive to move the average scores to the positions marked in green for growers and purple for vintners. When these goals are attained, practices will have improved from the initial benchmark averages by 20%. To reach these goals, CSWA needs partners. If you are interested in improving energy practices in the wine community, please email info@sustainablewinegrowing.org.

"I learned a lot and the questions pointed out many areas that I need to address — very useful. Time well spent."

WORKSHOP PARTICIPANT, SONOMA COUNTY, DECEMBER 2003