



CHAPTER 7

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Managing Energy Challenges

Energy availability has become a major risk factor creating financial stress and vulnerability for vineyard and winery operations, and for companies throughout the supply chain. The combination of fluctuating energy prices and uncertain oil supplies is straining current business and could impede the future viability of companies throughout the country. For California, the projections for increased energy demand by an expanding population will challenge the capacity for sufficient energy generation and distribution (SWP Workbook, p. 9-1).

Moreover, conventional patterns of energy use are contributing to serious public concerns about greenhouse gas (GHG) emissions and associated societal risks tied to global climate change. Accordingly, new government regulations in California are placing restrictions and requiring companies to improve their energy efficiency and adopt other practices that reduce GHG emissions and mitigate climate change (see **Box 7.1**).

These trends underscore the need for vineyards and wineries to update their energy management plans. More than ever, it is essential to have a comprehensive energy management plan and to implement actions that increase energy conservation, efficiency, and use of alternative energy sources when possible. These actions will help companies reduce costs and risks, mitigate or adapt to climate change, and increase the sustainability of business.

The good news is that increasing numbers of California vineyard and winery operations are implementing energy efficiency practices and using renewable energy sources. Dozens of California wineries throughout the state have taken advantage of free energy audits and rebates for implementing energy efficiency measures and alternative energy. For instance, according to Sunlight Electric CEO Rob Erlichman, Napa County wineries have adopted solar energy 42 times faster than the average for California businesses. These practices result in important benefits, including reduced energy consumption, costs, and risks. Energy prices are likely to rise in the future, so conserving and efficiently using energy will be crucial to sustaining business operations.

Climate Change Concerns and Legislation Affecting California's Wine Industry

Since climatic shifts can dramatically affect the production and quality of grapes and wine, global climate change has generated major concerns and risks for winegrowers across California. Scientific projections indicate variable impacts from climate change across the major wine-growing regions, which have initiated efforts to mitigate and adapt to climate change.

California passed a law in 2006, known as AB32, which establishes the first-in-the-world comprehensive program using regulatory and market mechanisms to achieve real, quantifiable, and cost-effective greenhouse gas (GHG) reductions. The law mandates an 11% reduction of "business as usual" GHG emissions by 2010 followed by a 28% reduction by 2020.

California's Wine Institute partnered with organizations in Australia, New Zealand, and South Africa to develop a GHG protocol and calculator to measure the GHG footprints of winery and vineyard operations (www.wineinstitute.org/ghgprotocol). This capability is especially important to ensure compliance with AB32 and other potential regulations. Furthermore, results from using the calculator will help growers and vintners determine ways to conserve energy, increase energy efficiency, and produce clean, renewable energy – reducing energy related costs and risks.

A. Practices to Reduce Risk & Improve Energy Efficiency

Planning, Monitoring, and Achieving Results

Good energy management starts with measuring and knowing your energy use, and implementing a comprehensive plan.

- Monitor and record total energy used throughout the year; get a detailed energy audit (take advantage of free audit services if your energy provider offers them - See **Box 7.2** for websites and other information)
- Identify usage patterns, inefficiencies, opportunities, and priorities in your business
- Develop an integrated energy management plan for all aspects of the operation
- Set yearly goals for overall energy use, according to baseline monitoring data
- Include contingency options in the plan, in order to meet energy needs at critical times, such as on-site generation capabilities during crush
- Implement the plan(s), focused on priorities, and demonstrate a measurable reduction in energy per ton and/or per gallon production each year
- Incorporate energy use and conservation in a comprehensive training program for employees
- Network with other winery operations and attend energy workshops to learn what does and does not work

Motors, Drives and Pumps

- Test selected new technologies to improve the energy efficiency of your motors, drives, and pumps
- Carry out an efficiency evaluation of vineyard water pumps. Find out if you qualify for free pumping audit service offered by your local utility
- Select and purchase new equipment made for optimal energy performance and results
- Use energy efficient technologies and designs, such as stacking tanks, installing solar aerators, utilizing smaller diameter pipes, and installing software for monitoring equipment performance, where possible
- If you use diesel pumps, consider switching to electric pumps and using renewable energy (such as solar or wind) to power them

Heating Ventilation and Air Conditioning (HVAC)

- Test new technologies to improve the efficiency of your HVAC system
- Regularly schedule and record maintenance of the HVAC system by checking insulation, weather stripping, and using window film
- Reduce heating and cooling loads for the facility by increasing the R-value of insulation, passive ventilation, cool roofs, and lighter shades of paint on buildings
- Use energy efficient technologies and designs throughout the facilities

Lighting for All Facilities

- Test new energy-efficient technologies
- Clean light fixtures annually
- Install motion detectors throughout the facility
- Train employees to turn off lights when leaving areas
- Use compact fluorescent lights and/or other improved efficiency lighting in all appropriate locations
- Design lighting to illuminate areas needed at the time (task lighting) and use natural light if possible. Disconnect unnecessary lamps and fluorescent ballasts
- Use energy efficient lighting technologies and designs, such as automatic room lighting controls, mercury vapor, sodium and sulfur lamps, and natural light tubes

- For outdoor lighting, install sodium and/or sulfur lamps, and design lighting to illuminate key security areas or with motion detectors, as appropriate
- Train security guards to turn off lights as they go on their rounds

Transport

- Ensure that your vehicles are running at high fuel-efficiency levels; make sure that oil changes and maintenance are undertaken regularly to increase efficiency
- Avoid extra travel by all employees; hold conference calls or video conferencing when possible instead of taking long trips for meetings
- Provide training to employees about measures they can take to save fuel, such as lowering speeds, avoiding idling motors, etc.
- Consider purchasing new vehicles that are high efficiency or hybrid vehicles
- Establish car pools or other means of combining transport among employees; provide incentives for employees who are carpooling
- Consider purchasing/using biodiesel for vehicles that run on diesel
- Coordinate trips to stores through the individual in charge of purchasing

Table 7.1 Costs & Benefits of Various Fuels for Transport

Fuel type	Advantages	Disadvantages and other comments
Gasoline	Currently available widely at commercial pumps	Uncertain supplies and costs; high GHG emissions
Diesel	Currently available at commercial pumps	Uncertain supplies and costs; high GHG emissions
Biodiesel	Reduces dependency on oil; renewable source; lower GHG emissions	More difficult to access; recent questions about using soy as stock
Ethanol	Reduces dependency on oil; low GHG emissions; renewable source	Difficult to access in CA; problems using corn as stock; raises food prices
Straight Vegetable oil	Lower GHG emissions; renewable; often available from oil waste products	Conversion of vehicle engines is necessary; sometimes difficult to source

Office Equipment

- Test new technologies to improve office equipment energy efficiency
- Turn off office equipment when not in use
- Consider energy consumption when office equipment is upgraded or replaced, and get Energy Star® certified equipment, when possible
- Install power strips with timers in offices to turn off equipment at end of day

Refrigeration System (For Wineries)

- Select and maintain technologies for optimal performance
- Reduce chiller loads by building insulation, insulating tanks (both inside and outside), incorporating night air cooling, and off-peak evaporative cooling and/or ice making

Box 7.2

Energy Savings for Lighting Energy Efficiency

- Replace incandescent light bulbs with compact fluorescent light bulbs. (Save up to 10%)
- Install automatic room lighting controls, depending on occupancy or time. (Save 1-3%)
- Install task lighting instead of overhead lights—light only areas needed. (Save up to 7%)
- Disconnect unnecessary lamps and fluorescent ballasts. (Save up to 8%)
- Retrofit T12 lights & magnetic ballasts to T8 lights and electronic ballasts. (Save 10-15%)

Source: California Technology, Trade and Commerce Agency Energy Efficiency Tips, reprinted from Chapter 9 in the Code of SWP, 2006.

References and Resources

California Sustainable Winegrowing Alliance, Wine Institute, and California Association of Winegrape Growers (2006). Code of Sustainable Winegrowing Practices Self-Assessment Workbook.

PG&E provides many services and information to wineries and vineyards, including audits and Savings by Design, a service that helps improve energy efficiency in new buildings. See <http://www.pge.com/mybusiness> and <http://www.savingsbydesign.com/>.

Flex Your Power is another good source of information <http://www.flexyourpower.com/>. This site provides access to energy saving tips, best practices, financial incentives, a consumer energy center, and a special section for the agriculture industry with tips on saving energy during irrigation and cooling farm buildings.

If you want to find out about potential rebates offered by your energy provider in California go to <http://www.consumerenergycenter.org/>.

For additional information on incentive programs for renewable energy, please see the following website: <http://www.dsireusa.org/library/includes/map2.cfm?state=CA¤tpageid=>

For a comprehensive list of energy resources visit http://www.sustainablewinegrowing.org/webresources.php?ContentArea_ID=6.

- Use energy efficient technologies, such as evaporative condensers, extra heat exchange surfaces, condensers fitted with flow-control valves to reduce pressure and temperature, chillers that can operate at moderate or high cooling stages, and variable-speed fans for cooling towers

Tanks and Lines (For Wineries)

- Identify and consider new technologies that improve the energy efficiency of cooling and heating tanks
- Install insulated jackets on tanks
- Install insulation on Glycol lines
- Locate tanks in places that reduce cooling and heating needs (if appropriate/possible)
- Provide covering for outside tanks to reduce heat load

B. Alternative Sources of Power – Vineyards and Wineries

- Do an energy audit and implement energy efficiency measures before considering and installing an alternative source of power
- Check your potential for wind and solar power at <http://firstlook.3tiergroup.com/>
- Prepare a financial analysis to evaluate the use of renewable energy, including solar, wind, fuel cells, geothermal, in your vineyard or winery operations; consider the value of incentive programs or RECs (renewable energy credits)
- Install solar photovoltaic panels or passive solar hot water systems, if feasible; consider the value of incentive programs or RECs (renewable energy credits)
- Design or retrofit buildings to maximize the potential use of passive solar for heating, if economically feasible
- If feasible, install a system(s) using another alternative energy source, such as wind, methane digesters, fuel cells, or geothermal
- Monitor the energy use and savings of renewable energy technologies to understand how the results compare to your previous approach
- If you use alternative energy, use your operation as an example or demonstration for other growers or wineries exploring alternative fuel options



Participants at an energy efficiency workshop on a tour of Sutter Home to learn about their energy efficiency practices, such as insulated outdoor tanks.