



The California Energy Commission and the U.S. Department of Energy,
Office of Industrial Technologies BestPractices present:

ENERGY SOLUTIONS FOR CALIFORNIA INDUSTRY: WAYS TO IMPROVE OPERATIONS AND PROFITABILITY

JANUARY 2002

CASE STUDY

BENEFITS

- Increases operating income by \$49,000 annually
- Reduces annual electricity purchases by 168,000 kWh
- Increases equipment life

APPLICATIONS

Refrigeration systems can consume significant amounts of energy. Effective controls can reduce energy consumption, increase equipment life and reduce maintenance needs.

ABOUT THIS EVENT

The purpose of the Energy Solutions for California events is to provide a *professional, solutions-oriented* environment for industrial electricity users who face serious challenges to remaining operational and profitable during the current energy crisis. Industrial electricity users have the opportunity to receive unbiased information and analytical tools that can increase reliability and manage short and long-term production costs.

Controls Upgrade at a Winery Saves Energy and Increases Equipment Life

Summary

In early 2001, Fetzer Vineyards installed controls on the refrigeration system at its Hopland Winery in Hopland, California. Mindful of the need to reduce energy consumption, the staff at Fetzer's winery realized that with a sophisticated control package, the winery's refrigeration system could consume less energy and reduce wear and tear on the system's components. The controls installation lowered the winery's annual energy consumption by over 168,000 kWh, and maintenance costs by \$4,000, which led to total annual savings of \$21,250. In addition, Fetzer received a \$28,000 rebate from its utility. Since the project's cost was \$66,000, the simple payback is just over 3 years.

Company/Plant Background

Established in 1968, Fetzer Vineyards began as a family farm and has grown to become the sixth largest premium wine producer in the U.S.



Fetzer Vineyards



Fetzer produces four lines of varietal wines, which are marketed throughout the world. Since its inception, Fetzer has been proactive towards energy conservation and environmentally friendly production including organic grape growing. In the early 1990s, Fetzer experienced rapid expansion, leading to the establishment of a new winery in Paso Robles, California.

The Hopland winery is Fetzer's main production site, with 7.7 million gallons of steel storage capacity, seven grape crushers, and an annual fermentation capacity of 35,000 tons. The site also includes separate temperature controlled areas for fermentation, a bottling operation, and a 600,000 case storage center.

Project Overview

White wines such as Riesling, Gewürztraminer and White Zinfandel are produced at very cold temperatures (28° Fahrenheit). During wine production and storage, it is essential to maintain the wine at this temperature because if it is exceeded, the wine can spoil, leading to losses of production. At Fetzer's Hopland winery, these white wines are cooled in tanks covered with jackets through which glycol is passed. The glycol is periodically chilled by a refrigeration system composed of twenty-one separate compressors totaling 1,380-hp (nineteen 60-hp and two 120-hp compressors).

Prior to the project, the winery needed to operate all 21 compressors at full load during the harvest period (September to December) and eight of the 60-hp compressors during the rest of the year. Since the system was not equipped with a control system, it would run whether or not the glycol required additional cooling.

Project Implementation

After careful research, the winery staff decided to install a Programmable Logic Controls (PLC) package on its refrigeration system. The controls are integrated into the wine cooling system through sensors that monitor the return glycol temperature and pressure. As the return glycol temperature increases, the new controls cycle compressors on and then cycle them off when the glycol temperature returns to the required level. Since the controls were centralized, they did not require much space and could easily be fitted in a 4'x4' box on the refrigeration pad.

In addition to the efficient modulation of the refrigeration system's compressors, the controls allow for reduced runtime of the corre-

sponding chilling tower pumps since the glycol does not need to be constantly circulated.

Project Results

The new control package has improved efficiency of the winery's refrigeration system, resulting in substantial energy savings. The new controls provide a centralized control strategy that is very responsive to changes in glycol temperature and allows the system to load and unload compressors when they are needed. This improved control strategy has reduced the number of compressors required and the amount of time for which they need to be operated. The winery is now able to cool its glycol adequately with seven compressors instead of eight during the off-harvest period and estimates that it will only have to run 18 instead of 21 during the harvest period. Since the compressors are not used as heavily as before, their maintenance needs are lower and their useful life span has increased. The annual energy and maintenance savings total \$21,250 and 168,000 kWh. With a project cost of \$66,000, the simple payback is slightly more than 3 years.



Refrigeration Upgrade

Lessons Learned

Effective control of industrial motor systems is essential for energy efficiency. Ineffective or obsolete control systems and strategies can lead to energy waste, excessive capital purchases, higher long-term maintenance costs, and reduced equipment life. Determining the type and sophistication level of controls needed to optimally manage an industrial motor system can reduce energy use, increase equipment life, lower maintenance costs and improve efficiency. By installing well-configured, modern controls on their refrigeration system, Fetzer's Hopland Winery has been able to save energy and improve the efficiency of its refrigeration system.

United States Department of Energy's Office of Industrial Technologies BestPractices

BestPractices is part of the OIT's Industries of the Future strategy, which helps the country's most energy-intensive industries improve their competitiveness. BestPractices brings together the best-available and emerging technologies and practices to help companies begin improving energy efficiency, environmental performance, and productivity right now.

California Energy Commission

The California Energy Commission is the state's primary energy policy and planning agency. It is the California Energy Commission's mission to assess, advocate, and act through public/private partnerships to improve energy systems that promote a strong economy and a healthy environment.



California Energy Commission
and U.S. Department of Energy
present

ENERGY SOLUTIONS FOR CALIFORNIA INDUSTRY

Ways to Improve
Operations and
Profitability

PROJECT PARTNERS

- Fetzer Vineyards
Hopland, California
- Westec Tank Company
San Carlos, California

For Additional Information, Please Contact:

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